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# Key Strategies of Sustainable Real Estate Decision-Making in the United States: A Delphi Study of the Stakeholders

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KEY STRATEGIES OF SUSTAINABLE REAL ESTATE  
DECISION-MAKING IN THE UNITED STATES:  
A DELPHI STUDY OF THE STAKEHOLDERS

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A Dissertation  
Presented to  
the Graduate School of  
Clemson University

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In Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy  
Planning, Design & the Built Environment

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by  
Pernille Christensen  
December 2012

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Accepted by:  
Dr. Elaine Worzala, Committee Chair  
Dr. Elizabeth Baldwin  
Dr. Cliff Ellis  
Dr. Leidy Klotz

## ABSTRACT

*Sustainable real estate is a growing sector within the commercial real estate industry, yet there is still a lack of consistency among the multitude of sustainability performance measurements and reporting requirements around the world. As a result of this confusion, stakeholders have developed different strategies and requirements for sustainability, which in turn makes it difficult to communicate with other stakeholders about sustainability in real estate. Without the ability to communicate with other stakeholders about sustainability efforts, comparison of sustainable real estate becomes a challenge, thus impeding progress towards a competitive sustainable real estate market.*

*This study presents the results of a Delphi study that was completed in the United States in 2011-12. A modified Delphi Method was used to investigate the nature of performance measurements and reporting requirements used in the sustainable real estate market, as well as their impact on the related decision-making process used by each of the major stakeholders in the real estate process. For the purpose of this study, the real estate stakeholders include: public and private real estate investors, corporate users, tenants and developers in the United States. The first round of the Delphi was conducted as in-depth interviews with fourteen expert panelists that represent each of the stakeholder groups to gain a deeper insight into the sustainability thought processes and decision-making strategies that have been used by these experts. Interviews were then transcribed and coded using MaxQDA software. The second round consisted of follow-up conversations, either by phone or email, related to specific topics that had emerged*

*during the first round of interviews. During this round Delphi panelists were also given the opportunity to vet the information from the first round of interviews. Experts were able to make additional comments to clarify statements that they perceived had come from their own first interviews and comments on topics that emerged in other interviews but had not initially been discussed in their interview. The third round of the Delphi process utilized an e-questionnaire to clarify the findings and highlight the areas in which the U.S. real estate industry has begun to align on sustainability issues, as well as those areas of disconnect which still make comparison of sustainable real estate a challenge, in an effort to improve communication among stakeholders – and ultimately competition in the sustainable real estate market.*

*Building on the four generations of sustainability presented by Simons, Slob and Holswilder (2001), results from this research suggest that the U.S. real estate market has turned a corner with respect to sustainability in real estate and has entered a new, post-recession generation of sustainability. However, there are still areas of miscommunication among the stakeholders, and inconsistency with regard to specific performance measurements being used to track and report sustainability efforts.*

## DEDICATION

For Beethoven,

Who has supported me unconditionally throughout this effort,

As well as every major endeavor in life.

## ACKNOWLEDGMENTS

I would like to thank my comment members for their expert guidance and support throughout my tenure at Clemson University. In particular, my committee chair, Dr. Elaine Worzala, who looked for opportunities to expose me to the broader academic research community and encouraged me to pursue my passion for sustainability through this research study; Dr. Elizabeth Baldwin, who introduced me to qualitative methods and was instrumental in developing the research design and methods for the dissertation; Dr. Cliff Ellis, whose vast knowledge of the literature always challenged me to dig a little deeper; and Dr. Leidy Klotz, whose understanding of contemporary sustainability issues helped keep the research focused.

I would also like to acknowledge the support of my PDBE cohort, in particular Dr. David Hueber, Brooklyn Wynveen and Erik Simon. Having a group of like-minded people who are willing to discuss the research challenges encountered throughout this process and willing to listen while I bounced ideas around was invaluable when, as Billy Ocean sang, “The going [got] tough”.

Lastly, I would like to thank the Land Economics Foundation (LEF) who funded the portion of the dissertation focusing on the development of the industry survey instrument.

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## CHAPTER ONE

### THE RESEARCH PROBLEM

#### **INTRODUCTION**

Sustainability issues apply to all property - but property is a complex asset. Real estate investors, occupiers and developers, all of whom have ideas about how sustainability can be implemented, rely on different criteria to make decisions and look for different potential outcomes. While a multitude of assessment and rating tools have evolved since the 1992 Rio Earth Summit, there is still a paucity of literature related to how the various stakeholders in the real estate process actually make decisions related to sustainability in the commercial real estate industry, as well as what criteria are used to generate those decisions for each of the various stakeholder groups.

The purpose of this research inquiry is to investigate the nature of each stakeholder group's understanding of the concepts of 'sustainability' and 'sustainable real estate', the performance criteria and indicators used to make decisions about sustainability, strategies for integrating sustainability initiatives into strategic decision making related to commercial real estate and to identify both the commonalities and differences between the stakeholder groups for each of these topics. The aim is to help the real estate community improve transparency between real estate stakeholder groups. For example, investors need to understand corporate social responsibility and sustainability requirements (CSRS) so that they are able to match the product, i.e. building, to the consumer, i.e. the tenant.

Applying a cynical perspective, one often hears that developers only care about sustainability if their investors demand it, and that investors only care about sustainability if the corporate occupiers demand it. However, research findings indicate that ‘good’ (i.e. financially stable) companies are demanding and occupying sustainable buildings, and therefore, by default, sustainable products tend to have higher return on investment (Roberts, 2009; RREEF, 2010). The success of the Dow Jones Sustainability World Index (DJSI World) further supports this statement. Founded in 1999, the DJSI World “covers the top 10% of the biggest 2,500 companies in the Dow Jones Global Total Stock Market Index in terms of economic, environmental and social criteria” and selects sustainability leaders in each of 57 industry groups represented in the Dow Jones based on a “systematic corporate sustainability assessment” executed by SAM<sup>1</sup>. The DJSI World has out-performed the Dow Jones every year since its inception (DJSI, 2011).

Real estate investment funds are also embracing the sustainability movement (RREEF, 2010) with the creation of sustainable/‘green’ funds/REITs – and several have made public statements that they plan to divest non-sustainable property assets in their portfolio(s), and only invest in sustainable assets moving forward. However, because there is lack of consistency among the multitude of rating systems and sustainability indicators used around the world, public and private investors, owners and corporate tenants are developing their own sustainable real estate decision-making matrices or are

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<sup>1</sup> SAM – previously Sustainable Asset Management – was founded in 1995 as an asset management company. In 1999 they partnered with Dow Jones Indexes to create the Dow Jones Sustainability Indexes (DJSI) and since then SAM has conducted research on sustainable investment factors on over 1,100 companies annually. In 2006, SAM Sustainability Services was created to provide sustainability insight and performance analysis to companies and interested stakeholders. The *Sustainability Yearbook*, published annually by SAM, highlights corporate sustainability performance of participating companies and identifies the major sustainability trends in the marketplace. ([www.sam-group.com](http://www.sam-group.com))

hiring specialty companies such as SAM, who have developed sophisticated sustainability assessment indicators/matrices as a result of their independent research (including the assessment framework for the DJSI). This inconsistency of not only the assessment rating systems and associated sustainability scores, but also of the criteria and indicators which they use to track progress toward and/or attainment of sustainability goals, makes it difficult to evaluate and compare sustainable assets. In turn this has resulted in a lack of competition in the sustainable commercial real estate market (Ellison, Sayce and Smith, 2007; Ellison and Brown, 2010).

## **RELEVANCE**

In commercial real estate, most professionals can clearly identify an ‘A’ class office space, ‘B’ class office space or ‘C’ class office space within their market. This is helpful because someone interested in a given building can compare office space, rents, amenities, etc., thus making the real estate market place more transparent, competitive and, theoretically, more efficient. This ability to evaluate attributes of a property allows investors to compare properties they are considering for their portfolios using an ‘apples to apples’ approach, and allows space occupiers to do the same thing for space they are considering for lease. However, this is not the case with the sustainability ‘class’ of commercial real estate where a multitude of assessment tools, criteria and indicators are available to influence sustainable real estate decision-making and assessment, as well as for use in reporting of sustainability performance. As a result of this disparity, there is currently only limited ability to compare sustainable properties using a similar ‘apples to

apples' approach. Consequently, individual investment firms, owners and commercial space users are developing their own sustainability guidelines from in-house research to help them make investment, occupancy, management and development decisions with regard to sustainability, thus further decreasing transparency in the market. The literature review in the following chapter (Exhibit 1.1 highlights the literature most influential in this research) reveals that both practitioners and academics indicated that there is a need to create a more unified sustainability assessment system but, to date, the disparate and eclectic nature of the various metrics used means that there is no one measurement (IPF, 2009; Lowe and Ponce, 2009; Ellison and Brown, 2010; RREEF, 2010).

Questions about the costs of sustainability initiatives and the impact sustainability initiatives have on the value of the asset have also been central to the sustainable real estate debate in recent years. The literature indicates that there is little to no difference in the cost of developing and redeveloping a commercial real estate building in a sustainable manner (vs. standard construction materials and methods). Generally, it seems there is approximately a 1-2% premium for sustainable real estate development, and current literature suggests that this premium is easily recouped from reduced utility costs, increased rents and higher occupancy rates. So why isn't everyone jumping on the sustainable real estate 'band wagon'? One challenge is in the perception of the concept of sustainability itself, and another is the challenge of integrating 'sustainability' into the practice of real estate investment, occupancy, management and development. This research investigates how real estate professionals understand these concepts and how these concepts are integrated into the strategic decision-making process for real estate.



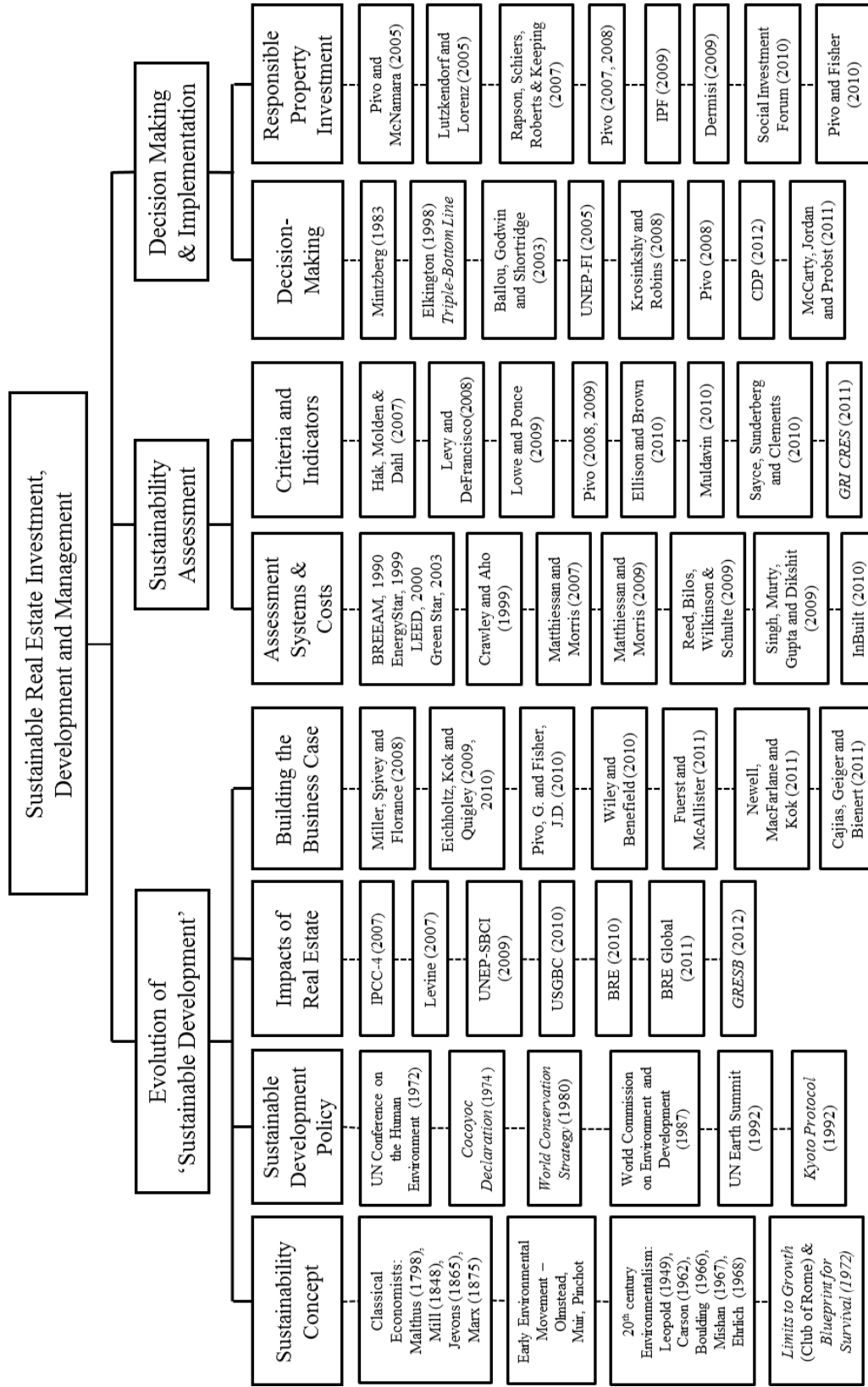


Exhibit 1.1 –Literature Review Overview. Not all literature was included in this diagram; works included have played pivotal role either in the research or as seminal works.

## **PURPOSE STATEMENT**

This research is both exploratory and descriptive in nature. It seeks to understand how the concepts ‘sustainability’ and ‘sustainable real estate’ are understood by stakeholders in the real estate process, and to describe whether/how these concepts are integrated into the commercial real estate strategic decision-making process. The purpose of the research is therefore threefold: 1) to gain an understanding of how the concepts ‘sustainability’ and ‘sustainable real estate’ are understood by each of the stakeholders in the real estate process; 2) to gain an understanding of how these concepts are applied in and integrated into the strategic decision-making process, specifically related to real estate decisions; and 3) to gain an understanding of the criteria used by the various stakeholder groups in the real estate process to make decisions about sustainability in commercial real estate, as well as the indicators used to assess sustainable real estate, so that each of the stakeholder groups can better understand the decision-making process of their collaborators in the real estate process. By understanding how/whether sustainability issues are being integrated in the decision-making process, the research aims to help industry practitioners in the following manner:

- Aid in making investment, management, occupancy and development decisions;
- Increase the transparency of the sustainable real estate asset class for the various stakeholders in the real estate process;
- Help the various stakeholders in the real estate community more easily assess whether an asset meets their goal of only investing/managing/occupying/developing ‘green’ buildings;
- Increase competition in the ‘green’ real estate market by improving the ability for actors to compare sustainable real estate investments.

## **RESEARCH QUESTIONS**

- What does the concept ‘sustainability’ mean to each of the stakeholder groups? How is the concept ‘sustainability’ understood by the different stakeholders?
- What does the concept ‘sustainable real estate’ mean to each of the stakeholder groups? How is the concept ‘sustainable real estate’ understood by the different stakeholders?
- How do the stakeholder groups apply their understanding of the concepts ‘sustainability’ and ‘sustainable real estate’ (i.e. how do stakeholders integrate sustainability related issues in the decision-making/strategic planning process related to commercial real estate)?
  - What are the criteria used to make decisions about ‘sustainable real estate’ by each of the different stakeholder groups?
  - What are the indicators used to assess ‘sustainability’ by each of the different stakeholder groups?
  - How/why do these criteria and indicators inform the decision-making process differently depending on the role of the stakeholder in the real estate process?
  - What are the barriers to making sustainable real estate criteria and indicators more transparent and more easily comparable?

## **RESEARCH METHODOLOGY, DESIGN AND METHODS**

The overarching paradigm for this research inquiry is based in Pragmatism. Pragmatic research is problem-focused, rather than methods-focused, and tends toward real world, practice oriented research. Because the aim of this research was to produce a framework for sustainable real estate decision-making with practical implications, the pragmatic approach offered the best framework to explore the research questions. One of the characteristics of pragmatic research is that it utilizes abductive reasoning.

The research design and methods used to carry out the research are diagrammed in Exhibit 1.2. Initially, a content analysis of the Leadership in Environmental and Energy Design (LEED): Existing Buildings Operations and Maintenance (EBOM) rating system was completed along with a review of professional and academic literature to identify the research questions. Next, the overall research design was developed and a modified Delphi Method was identified as the best research method to investigate the questions. After the completion of the pilot study and refinement of the research questions, the modified Delphi Method was used to create the dataset of observations. Fourteen real estate experts participated on the Delphi panel. Panelists were identified and qualified using a checklist of requirements developed from the literature. After a lengthy, iterative phenomenographic analysis, categories of description were identified and outcome space diagrams were developed to illustrate the hierarchies among the categories of description for each of the research questions.

Results were triangulated by performing a word frequency analysis on the data set created using the modified Delphi Method. Categories of description were identified for the word frequency analysis and compared to the results from the phenomenographic analysis completed on the first and second round interviews and follow-up discussions with the experts on the Delphi panel. The research results were then used to develop a framework for sustainable real estate strategic decision-making and assessment. The framework is intended to inform and advise practitioners in the real estate industry on how to begin, or to improve, both their understanding of the concept of sustainability and

how to integrate sustainability initiatives and strategies into their real estate decision-making and planning process.

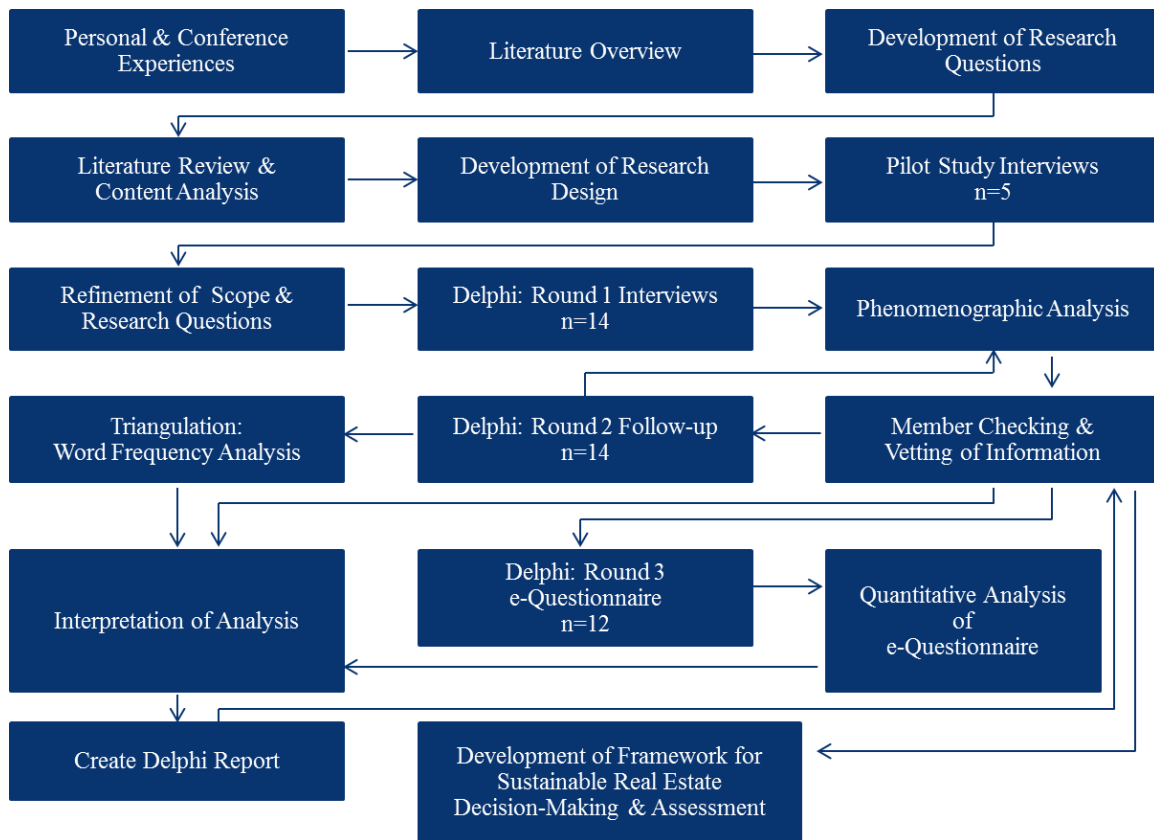


Exhibit 1.2: Flowchart of Research Process for the Modified Delphi Study. This diagram outlines the individual steps of the research investigating the key strategies of sustainability decision-making in the United States.

## Real Estate Stakeholders

For the purpose of this study, the following real estate stakeholder groups were considered: public and private investors, owners, corporate users, traditional tenants, and real estate developers. While the researcher recognizes that the building design community - including, among others, architects, engineers, designers and construction

consultants - actively engages in designing commercial real estate to incorporate sustainable features, these stakeholders are not included in this study because the research has assumed that these groups ultimately design based on the direction provided by the aforementioned stakeholder groups. Similarly, members of the broader financial/investment community - which includes, among others, lenders and underwriters - were not included in the study, as it was assumed that their perceptions were reflected through the input from the public and private investors on the Delphi panel of experts.

## **TERMINOLOGY: SUSTAINABILITY, GREEN, HIGH-PERFORMANCE?**

As noted by Chappell and Corps, “one of the greatest challenges in bridging the communication gap between [stakeholder groups] is the ability to successfully translate the concepts of one group to the other” (2009: 4). The term ‘sustainability’ is among one of the most widely used – and misused – terms in the real estate industry. Among the experts on the Delphi panel, five different ways of understanding the concept of ‘sustainability’ and four different ways of understanding ‘sustainable real estate’ were identified. Experts also acknowledged that there are a plethora of nuances even within these primary ways of understanding the concepts, and that different stakeholder groups have their own nuances in the way that they understand the word ‘sustainability’. In addition, the expert panel noted that, further confusing the issue, the word ‘sustainability’ is often used interchangeably with ‘green’ and ‘high-performance’ when discussing buildings with sustainable attributes. As a result of the different ways of understanding

the concept of sustainability, the criteria and indicators used for assessment of whether a building is ‘sustainable’/‘green’/‘high-performance’ also differs among stakeholders.

Throughout the research, the definition of sustainable real estate development personally referenced by the author is an excerpt of the definition adopted by the United Nations in the Brundtland Report:

... [real estate development that] ensures that it meets the needs of the present without compromising the ability of future generations to meet their own needs... Yet in the end, sustainable development is not a fixed state of harmony, but rather a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are made consistent with future as well as present needs (1987: 8-9).

Environmental, social, economic and governance eco-indicators were investigated in accordance with the pillars of sustainability identified by the Brundtland Report and expanded in the United Nations *Principles of Responsible Investment*.

## **SUMMARY OF RESULTS**

Each participant in the expert panel participating in the Delphi process was asked to define the concepts of ‘sustainability’ and ‘sustainable real estate’ as part of the interview process, as well as how they believe sustainability is understood by members of their stakeholder community. Experts were asked to reflect not only upon their own understanding of the concepts, but also on their perceptions of how the concepts are understood by members of their stakeholder group within the larger real estate

community. The results show that there is not universal agreement of how the concepts of ‘sustainability’ and ‘sustainable real estate’ are perceived among members of the real estate community; five primary factors of sustainability were identified, but the experts felt that not all of these factors were included when the concepts were considered by members of the broader real estate community. This was evident in the identification of five categories of description (i.e. different ways of understanding) for the concept ‘sustainability’, and four categories of description for the concept ‘sustainable real estate’. Similarly, there were four different approaches to integrating these concepts into the strategic decision-making and planning process - one of which was a non-approach that represents the many members of the real estate community who are still not actively pursuing or integrating sustainability initiatives.

The top drivers (i.e. motivators) for integrating sustainability concerns into the strategic decision-making and planning process, as well as the top criteria used in strategic decision-making and planning, were similar among all the stakeholders groups. Interestingly, the findings from the expert panel indicated that uniformity of criteria and indicators was less important than the simplicity of data gathering requirements. Experts advocated for gathering data on key performance indicators, such as energy and carbon footprint, for which industry standards have been developed over the past half a decade. The key performance indicators identified by industry experts emphasized the environmental aspect of sustainability and align with the sustainability performance reporting requirements of the leading sustainability reporting guidelines. All experts identified lack of understanding and available guidance as the primary barriers to



integration of sustainability concerns by the larger real estate community. It is the objective of this research to fill this gap in the literature and to offer real estate professionals insight into the how their collaborators in the real estate process are making decisions about sustainability, what criteria and indicators are influential in their decision-making process, and ultimately provide guidance via the sustainability decision-making and assessment framework proposed in the final chapter.

## CHAPTER TWO

### INVESTIGATING SUSTAINABILITY IN COMMERCIAL REAL ESTATE

#### **SUSTAINABLE DEVELOPMENT – WHAT DOES IT MEAN?**

The myriad of definitions for sustainable development, while well-intentioned, have resulted in an increased ambiguity and confusion with regard to what sustainability and sustainable development really mean. This is further amplified by the myriad of metrics, measures, and assessment systems that have developed from the multitude of sustainable development definitions (Ellison and Brown, 2010). Ultimately, what is most important for the purpose of moving forward in achieving sustainable development is to realize that the main focus areas are the same among all the definitions. When considering sustainable development from the perspective of the real estate industry, it is first critical to note that the word ‘development’, as it is often intended in sustainable development policy reports, most frequently refers to social and economic development, rather than the physical development of real estate in the built environment. This research aims to help build an understanding of the various attributes associated with sustainable real estate; what are the criteria used to ascertain sustainability in the built environment; what measures and indicators are used to assess sustainability; and how those criteria, measures and indicators are applied by the various stakeholders in the real estate process for the purpose of making decisions related to sustainable *real estate* investment, occupancy, management and development. This research will also aid stakeholders in understanding how their collaborators in the real estate process make decisions related to sustainability. This increased understanding will help overcome the

confusion brought on by the multitude of definitions found in this arena and will improve communication among the stakeholders so that new and renovated real estate can meet the sustainability requirements and needs of each of the stakeholders. As such, the ultimate goal of the research is to aid stakeholders in improving progress toward their sustainability goals, and to increase transparency in the market place by identifying the most influential criteria and indicators in sustainable real estate decision-making, thereby increasing comparability and competition in the sustainable real estate market place.

### **From Environmentalism to Sustainability**

The concept of sustainability has evolved to mean many things within different contexts; this is true also within the discussion of sustainable real estate (Lele, 1991). As a result, it is necessary to not only be clear about the scope of the concept of sustainability used in this research, but also to have an understanding of the evolution of the concepts of sustainability and sustainable real estate so that we can better understand where we are today.

Most discussions related to sustainability and sustainable development begin with the *Brundtland Report* (United Nations World Commission on Environment and Development (WCED), 1987) which is most often cited as the place where the term ‘sustainable development’ was first incorporated into global policy debate. However, the concept of sustainability had been discussed and applied in practice long before the *Brundtland Report*, albeit not using the specific term, sustainability. Among the earliest examples are in the work of classical economists such as: Malthus’ *An Essay on the*

*Principle of Population* (1798), which argued that the tendency toward geometric population growth meant that the population of the earth would always outstrip the available food supply; John Stuart Mill's *Principles of Political Economy* (1848), which included a discussion on the idea of 'stationary state economy'; William Jevons' *The Coal Question* (1865), which was the first attempt to apply Malthus' ideas regarding the dangers of exponential growth to the consumption of non-renewable resources; and Karl Marx's *Das Kapital* (1867), which argued for social sustainability as a requirement for economic sustainability.

Early environmental policy debate should also be considered a part of the conceptual evolution of sustainable development. In North America, the notions of resource management, best use, wise use and sustained yield, date back to the turn of the century. The organized environmental movement can be traced back to John Muir, whose opposition of development helped establish the Yosemite National Park in 1890. As the leader of the preservation movement, he opposed the policy of the conservationists, led by Gifford Pinchot. However, although Muir did succeed in founding the national parks movement which continued to fight for the protection of national parks against development pressures, it was Pinchot's 'wise use' (i.e. balance) of the multiple uses of natural resources that provided 'the greatest good for the greatest number over the longest time' and ultimately gained favor with president Theodore Roosevelt as the direction for US environmental policy. It was also during the mid-1800s that the landscape architecture profession began to develop. Frederick Law Olmsted emerged as a leader among his peers, allowing his designs to embody his social

consciousness and egalitarian ideals. His work to develop urban parks helped alleviate some of the environmental ills associated with overcrowding and air pollution in urban areas; a prime example of this work is New York Central Park (1858).

In the twentieth century, Aldo Leopold, often called the ‘father of conservation’, brought the conservation debate to the mainstream in his “The Land Ethic” essay, which was included in *The Sand County Almanac*. Here he stated that:

[A] thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is wrong when it tends otherwise... [it is right when the land ethic] changes the role of Homo sapiens from conqueror of the land-community to a plain member and citizen of it” (1949: 240).

Here Leopold argues for the intrinsic value of natural systems and warns that humans should tread lightly. To justify his land ethic, Leopold used a concept called the ‘precautionary principle’, which argues that long term human interest is best served by a healthy ecosystem, even if the short-term interest is best served by purely economic criteria (ibid). This philosophy is still at the heart of the contemporary sustainability debate as represented by the *Brundtland Report* (1987).

In the 1960’s, the first wave of the modern environmental movement gained momentum. First, Rachel Carson’s *Silent Spring* (1962) brought concerns about the environment to the public consciousness with her ability to take scientific research and communicate it to a broader population. In her book, she exposed some of the unintended and unpredicted consequences of technological development, specifically the pesticide DDT, and the destructive environmental impact that could occur when we begin to interfere with natural ecosystems before fully understanding them. Later, Kenneth

Boulding's, *The Economics of the Coming of Spaceship Earth* described the past 'open economy' philosophy of unlimited resources and countered that the 'closed economy' of our future will acknowledge that the earth has finite resources:

The closed economy of the future might similarly be called the 'spaceman' economy, in which the earth has become a single spaceship, without unlimited reservoirs of anything, either for extraction or for pollution, and in which, therefore, man must find his place in a cyclical ecological system (1966: 9).

Boulding's ideas about finite resources were further developed by Edward Mishan (1967), who contended that calculations for Gross National Product (GNP) needed to account for externalities when measuring national welfare, and Paul Ehrlich (1968), who took the controversial position that we needed to limit population growth in developing countries to protect the world from an imminent ecological collapse and depletion of natural resources.

These ideas related to limited natural resources continued to gain momentum in the early 1970s with several publications that called attention to human exploitation of the environment – in particular there was a growing global concern about the links between economic development and environmental constraints. The crystallization of these ideas was reflected in *The Limits to Growth* (Meadows, Meadows, Randers and Behrens, 1972) and *A Blueprint for Survival* (Goldsmith and Allen, 1972). *The Limits to Growth*, funded by the Club of Rome, used computer models to illustrate that the world's current trend of exponential growth in population and non-renewable resources consumption would result in severe shortages of food and non-renewable resources

within 100 years. There was significant critique of the model which stressed that the outputs of the model were determined by the programmers' Malthusian pessimism and underlying assumptions. Among the critics were the researchers from the Sussex University's Science Policy Research Unit which criticized the determinism of the model and of discounting society's ability to adapt (Cole, Freeman, Johoda and Pavitt, 1973). A *Blueprint for Survival* was published in advance of the 1972 UN Conference on the Human Environment in Stockholm and argued for a radical restructuring of society to prevent "the breakdown of society and the irreversible disruption of the life support systems on this planet" (Goldsmith and Allen, 1972: Preface). The authors recommended small, decentralized, de-industrialized communities based on tribal community structure which they argued were human-scale communities with a high degree of social cohesion and physical health achieved in part through successful population controls, low-impact technologies, sustainable resource management, and holistic, ecologically integrated worldviews. These two documents formed the basis of the policy origins for the concept of sustainable development, a concept which continued to evolve through a series of international conferences and published research reports, the first of which was the United Nations Conference on the Human Environment (UNCHE) in 1972 (Bebbington, 2001).

By the mid-1970's, these early environmental publications had awoken the public environmental consciousness and the first environmental era was begun. Ideas about the limitations of growth continued to influence research through the 1970's and into the 1980's. Herman Daly's *Steady-State Economics* (1977) applied the law of entropy to

demonstrate that economic activity in one place unavoidably creates pollution and waste in another place. Building on the idea that there is an absolute limit to how much the biosphere can absorb, Daly argued that the entropy law set a limit to the physical scale of the economy.

Reacting to this new public awareness, government began adopting new sets of environmental regulations and rules. Industry considered environmental investments a burden that would negatively impact the bottom line (Simons, Slob, Houke, Holswilder, and Tukker, 2001). The Carter administration, also concerned about the limitation of non-renewable resources and ‘the energy crisis’, commissioned a report on the state of the global environment up to 2000. *Global 2000* concluded that “barring revolutionary advances in technology, life for most people on earth will be more precarious in 2000 than it is now – unless the nations of the world act decisively to alter current trends” (Barney, 1981: 1). This led to investment in research into capital investment strategies, global warming impacts, alternative energy strategies, technology and infrastructure development, and biodiversity maintenance.

Although the United States emerged as a leader in the environmental movement during the sixties and seventies, this changed in the eighties when Ronald Reagan – an avid anti-environmentalist – was elected President. After his election, environmental leadership passed from the US to Europe, resulting in a change of focus from the wilderness issues that had been the primary concern of the American public, to issues related to industrialization that were central challenges facing Europe. Throughout this period, environmentalism was primarily a Western idea. Developing countries felt that



environmental issues were a concern of industrialized countries because they were more concerned with social and economic issues related to population growth and poverty. However, many environmentalists were coming to believe that these challenges were global in nature. Therefore, to persuade developing countries to get involved in the environmental dialogue, the discussion was expanded to include the social and economic issues relevant to developing countries – and the concept of sustainability was born.

### **Sustainable Development – Concept and Policy Evolution**

Sustainability, as a concept, entered the global environmentalism discussion in part as a means to engage the developing world. In this section, key international conferences and policy agreements are highlighted in an effort to identify the evolution of both the concept of sustainable development and the policy related to it. Exhibit 2.1 highlights the influential global conferences that have taken place since 1972, including when agreements were reached the name of the document/agreement that were developed from the conference, as well as key concepts which emerged.

| <b>INFLUENTIAL GLOBAL CONFERENCES AND POLICY AGREEMENTS</b> |                        |                             |  |   |
|---|------------------------|-----------------------------|--|---|
| <b>CONFERENCE</b>   | <b>YEAR</b>            | <b>ORGANIZING BODY(ies)</b> | <b>DOCUMENT</b>  | <b>KEY CONCEPTS</b>   |
| Conference on the Human Environment                         | 1972                   | The United Nations          | Stockholm Declaration  | Eco-Development   |
| Conference on Science and Technology for Human Development  | 1974                   | World Council of Churches   | Not Applicable   | Sustainable Society   |
| Not Applicable  | 1980 (updated in 1991) | IUCN<br>UNEP<br>WWF         | World Conservation Strategy  | Sustainable Development;<br>Need for global policy on development & conservation  |
| World Commission on Environment and Development             | 1987                   | The United Nations          | Our Common Future/Brundtland Report  | Sustainable Development;<br>Inter-Generational Needs  |
| Conference for Environment and Development/Earth Summit     | 1992                   | The United Nations          | Agenda 21,<br>Rio Declaration on Environment & Development,<br>UN Framework for Convention on Climate Change | Global Action Plan;<br>27 Key Principles to guide integration of environment & development policies;<br>Non-binding emissions environmental agreement |
| COP-3, Kyoto  | 1997                   | The United Nations          | Kyoto Protocol   | Emissions Reductions;<br>3 Mechanisms for Emission Reduction  |
| Rio+20 Conference on Sustainable Development                | 2012                   | The United Nations          | Not Applicable   | Emergence of Business Community in the Sustainability Debate  |
| Cocoyoc Symposium   | 1974                   | UNEP<br>UNCTAD              | Cocoyoc Declaration  | Finite Resource Limits;<br>Social and Environmental Justice   |

Exhibit 2.1: An Overview of Influential Global Conferences and Policy Agreements and the Key Concepts.

### ***The United Nations Conference on the Human Environment, Stockholm, 1972***

The United Nations Conference on the Human Environment (UNCHE) was held in Stockholm in June, 1972 and was the first major international conference focused on developing policy connecting environmental protection with social and economic development. Upon its conclusion, the delegates of the UNCHE created the Declaration of the United Nations Conference on the Human Environment – more commonly known as *The Stockholm Declaration*. *The Stockholm Declaration* laid out many of the core issues of sustainable development that are still at the heart of ongoing discussions. It stressed a need to protect and improve both natural *and* non-natural environments and proposed the concept of eco-development. Sachs (1978) described the concept as an “approach to development aimed at harmonizing social and economic objectives with ecologically sound management, in a spirit of solidarity with future generations...another kind of qualitative growth, not zero growth, not negative growth” (in Gardner, 1989: 339). In addition, the *Declaration* highlighted the need for international cooperation to address the growing set of environmental problems (Sachs, 1978; Holdgate, Mohammed and Gilbert, 1982; McCormick, 1986; Bebbington, 2001). Other important outcomes of the UNCHE included the establishment of the United Nations Environment Programme (UNEP), recognition by international governments for the need to protect and improve all living environments, and the growth of international environmental law (UNCHE, 1972). A weakness of the UNCHE was that it focused primarily on environmental issues faced by developed nations, such as those related to industrial development and rapid growth in consumption, with much less attention on the needs of developing countries for social

and economic development and environmental improvement. Both the successes and gaps of the *Declaration* would become central to future sustainable development policy discussions.

The United Nations Conference on the Human Environment (UNCHE) was followed by a conference convened by the World Council of Churches in 1974 on Science and Technology for Human Development. It was here that the term ‘sustainable society’ first emerged. Its principles of equitable distribution and democratic participation would become the cornerstones of the *Brundtland Report*, and continue to have influence as recently as the Rio+20 Summit in 2012. In that same year, the United Nations – Environment Programme and the United Nations Commission on Trade and Development (UNCTAD) held a symposium of experts in Cocoyoc, Mexico, resulting in the creation of the *Cocoyoc Declaration*<sup>2</sup>. The *Declaration* dealt with the question of how to “respect the ‘inner limit’ of satisfying fundamental human needs within the ‘outer limits’ of the Earth’s carrying capacity” (Dalal-Clayton, 2010: 2). *Cocoyoc* focused on environmental justice and linked unequal resource distribution between developing and industrialized societies with environmental pressure and degradation. With the expansion of the sustainable development definition beyond the Western concerns related to the environment to include social justice as well as an understanding that the earth’s resources are finite, the early influences of Marx, Boulding, Mishan, Ehrlich and the *Limits to Growth* are clearly evident. The *Cocoyoc Declaration* highlights the difficulty

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<sup>2</sup> For more information about the *Cocoyoc Declaration*, as well as an in-depth discussion of the evolution of global sustainable development policy, see Linner and Selin (2003).

of separating the meeting of human needs from environmental pressure. These ideas would later be reiterated in future policies throughout the next several decades.

### ***World Conservation Strategy, 1980***

The concept of sustainable development was further expanded to include consideration for inter-generational limitations in the *World Conservation Strategy* (International Union for Conservation of Nature and Natural Resources (IUCN) - currently the World Conservation Union, United Nations Environment Programme (UNEP) and the World Wide Fund for Nature (WWF), 1980), which noted that:

...human beings, in their quest for economic development and enjoyment of the riches of nature, must come to terms with the reality of resource limitations and the carrying capacities of ecosystems, and must take into account the needs of future generations... [this] gives rise to the need for global strategies both for development and for conservation of nature and natural resources (IUCN, 1980: I).

In addition, the *World Conservation Strategy* was the first global policy which attempted to define ‘sustainable development’ and, as such, it launched sustainability and sustainable development into the global policy debate (Bebbington, 2001; Dalal-Clayton, 2010).

For development to be sustainable, it must take account of social and ecological factors as well as economic ones: of the living and non-living resource base and of the long-term as well as the short-term advantages and disadvantages of alternative action (IUCN, 1980: Introduction).

It is important to note that the definition of ‘development’ applied in the *Strategy* is the “modification of the biosphere and the application of human, financial,

living and non-living resources to satisfy human needs and improve the quality of human life” (IUCN, 1980: Section 1.3). As such, sustainable development, as used in the *Strategy*, foreshadowed many of the ideas that would be integrated into the *Brundtland Report* seven years later. The most common criticism of the *World Conservation Strategy* is that it placed more emphasis on habitat conservation and ecological sustainability than sustainable development.

### ***The United Nations World Commission on Environment and Development, 1987***

The UN World Commission on Environment and Development (WCED) was the first conference to include discussion on the how to define sustainable development. The most frequently referenced definition, often called the *Brundtland* definition, first emerged in the WCED conference proceedings document, *Our Common Future* - more commonly known as the *Brundtland Report* after its Chairperson, Gro Harlem Brundtland, Prime Minister of Norway:

Sustainable development is development that **meets the needs of the present without compromising the ability of future generations** to meet their own needs (WCED, 1987: 43).

For the first time, society was asked not only to consider what will happen in our lifetime, but also the impact our decisions will have on future generations. In addition, *Brundtland* emphasizes that sustainability:

...is not a fixed state of harmony, but rather **a process of change** in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are **made consistent with future as well as present needs.**” (WCED, 1987: 8-9).

The idea that sustainability is in a constant state of flux as a result of decisions being made at every stage of the real estate development process offers real estate decision-makers a unique challenge - how does one integrate sustainability issues and implement sustainability initiatives when the requirements are constantly changing in the market? This research seeks to shed light on the strategic decision-making process and offer a framework for sustainable real estate decision-making, as well as a framework for sustainable real estate assessment and management.

The WCED brought the discussion of sustainable development to a wider audience than any of the previous UN reports and conferences. Following the publication of the *Brundtland Report*, interest in sustainability and sustainable development increased rapidly and a series of alternative definitions for ‘sustainable development’ emerged. These alternative definitions most often included an interpretation of ‘development’ and the conditions necessary for ‘sustainability’ (Mitlin, 1992). The multitude of definitions demonstrates that sustainable development is a concept too broad to be captured in a single definition, however most agree that uncontrolled exploitation of non-renewable resources is not beneficial to society in the long term (Hill and Bowen, 1997). Several authors provide a thorough description of these alternative sustainable development definitions (Pezzey, 1989; Pearce, Barbier and Markandya, 1989; and Rees, 1989).

However, Dalal-Clayton notes that “despite the wealth of references to the *Brundtland* definition, it is not supported by professional consensus” (2010: 2). Banuri and Weyant (2001), citing a list of industry experts, support this statement and note that, “although the ubiquity of references to this [Brundtland] definition suggests a degree of

scholarly consensus, this is not the case. There is considerable disagreement on conceptual grounds, and perhaps most significantly, on its operationalization” (Banuri and Weyant, 2001: 93). Perhaps this is because the “simplicity of [the Brundtland] definition belies what is a complex web of systems and cycles in science, economics, politics, ethics and engineering” (Lowe and Ponce, 2009: 1). As such, it is critical to keep in mind the complex relationships woven together in the concepts of sustainability and sustainable development when attempting to create common metrics that capture the interplay between economic, environmental and social impacts of real estate on the planet, and more specifically, on the community where the real estate is located.

### ***The UN Conference for the Environment and Development, Rio de Janeiro, 1992***

*Our Common Future* paved the way for the UN Conference for Environment and Development (UNCED) in Rio de Janeiro in 1992, otherwise known as the ‘Earth Summit’, which brought more heads of state together than ever before (117 heads of state and 178 governments were represented). Among the important outcomes of the UNCED was the creation of the Business Council for Sustainable Development (BCSD) – later renamed the World Business Council for Sustainable Development (WBCSD). Although not originally perceived to achieve any significant changes in the business practices of its members, the WBCSD has since been actively involved with developing the business case for sustainable development (Holliday, Schmidheiny and Watts, 2002). In addition, a set of five agreements were approved and these agreements still inform contemporary policy making related to sustainable development. The most relevant of these with



regard to sustainable real estate are: *Agenda 21*, *The Rio Declaration on the Environment and Development* and *The UN Framework Convention on Climate Change*.

Agenda 21 emphasized a bottom-up approach and stressed that citizen participation in the development process as well as the role of the market, industry trades, and the business community in creating sustainable development. Critique of Agenda 21 notes the inadequate discussion of unsustainable consumption patterns and the national policies and strategies that can be implemented to promote more sustainable consumption patterns, population growth, international debt, and militarism. Despite being one of the least developed chapters of the agreement, from a real estate industry perspective the most relevant discussion in Agenda 21 pertains to sustainable development patterns and city planning initiatives. In our current political climate, Agenda 21 has become a hot topic during the 2012 election year with opponents attempting to link sustainable ‘smart growth’ planning principles to big government. This debate highlights the lack of understanding by the public of not only the social and environmental benefits of ‘smart growth’, but also the proven community and economic benefits to both community members and businesses of sustainability and sustainable planning efforts.

The Rio Declaration on Environment and Development had been envisioned by Maurice Strong, the Secretary General of the Conference, as a brief statement of a new global environmental ethic (Grubb, Koch, Thomson, Munson and Sullivan, 1993). What emerged was a “lengthy and uninspiring piece of diplomatic jargon” (Dresner, 2002: 43) proposing 27 key principles to guide the integration of environment and development policies (including the polluter pays, prevention, precautionary and participation

principles). The anthropocentric nature of the first four principles of the Declaration highlights its failure to create a ‘new’ global environmental ethic (ibid).

The main impetus for the *UN Framework Convention on Climate Change* came from the Intergovernmental Panel on Climate Change (IPCC) report (1990) which predicted that if CO<sub>2</sub> emissions continued to rise at current levels, the earth’s temperature would increase by 1.5-4.5 degrees centigrade over the next century. The panel’s recommendation to the UNCED was that a 60% reduction in CO<sub>2</sub> from then-present levels would be necessary by 2040 to stabilize the climate (IPCC, 1990). However, although the UNCED acknowledged that climate change was a real problem, the best agreement that could be reached was a goal to return CO<sub>2</sub> emission to 1990 levels by 2000. It is crucial to also note that the US refused to accept the binding agreement despite emitting more CO<sub>2</sub> than any other country in attendance because President Bush felt that such an agreement would be economically detrimental to the US economy (Dresner, 2002; Dalal-Clayton, 2010). Interestingly, President Obama used the same target goals of carbon emissions reduction as a reason to invest into green energy and infrastructure as part of his efforts to rejuvenate the economy. While President Obama’s efforts to date have been largely unsuccessful from the perspective of the impact that those government investments have had on the economy and job creation, private investment into green energy and infrastructure during this same period has had a positive economic impact in the communities where investments are being made.<sup>3</sup>

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<sup>3</sup> Several interesting articles covering both sides of the green energy investment debate include: [www.examiner.com/article/obama-signs-executive-order-to-accelerate-green-energy-polices-industry](http://www.examiner.com/article/obama-signs-executive-order-to-accelerate-green-energy-polices-industry) and [www.marketwatch.com/story/green-energy-investments-are-necessary-2012-10-03](http://www.marketwatch.com/story/green-energy-investments-are-necessary-2012-10-03)

***Conference of the Parties to the Framework Convention on Climate Change (COP-3),  
Kyoto, 1997***

The Earth Summit was largely considered to be a failure with regard to global policy development, and the movement seemed to lose steam as environmental and sustainable development sank lower on the international policy agenda. Over the next decade several attempts were made to reconvene the issue, however, little progress was made toward creating global sustainable development policy. The United States continued to be a major obstacle to progress on developing target goals and timetables, despite the change of power from Republican to Democrat leadership in the White House (Dresner, 2002). One exception was at COP-2 in Geneva (1996), where the Clinton administration accepted the warnings of the Second Assessment Report of the IPCC (1995) and agreed to the principle of binding targets.<sup>4</sup> As the country with the largest CO<sub>2</sub> emissions, the US was a crucial participant without whom agreement was unlikely to have been made.

This acceptance of establishing binding targets and timetables by emissions-heavy countries enabled negotiations at COP-3 to develop the *Kyoto Protocol* (1997). The final *Protocol* was not completed until the day after COP-3 ended and represented an uneasy compromise among the participating countries. The targets set in the *Protocol* were extremely modest compared to the scientific findings in the IPCC report (1995) which indicated a need to reduce emissions by 60-80% in order to limit global warming.

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<sup>4</sup> All the JUSSCANZ countries, except Australia, agreed to the principle of binding agreements. The JUSSCANZ countries include: Japan, United States, Switzerland, Canada, Australia, and New Zealand. This was a major turning point in the negotiations because the JUSSCANZ countries had backed the US in Berlin at COP-1 (1995) when the US opposed the principle of binding targets and timetables.

Industrialized countries (referred to as Annex-1 countries) committed to an overall reduction of 5.2% of their collective annual emissions of the main greenhouse gases compared with 1990 levels during the commitment period of 2008-2012. Each industrialized country had different targets based on consumption.

- The US target was an emissions reduction of 7% from 1990 levels;
- The European Union agreed to ‘burden sharing’ and committed to an 8% reduction from 1990 levels, with Spain, Portugal, Greece, and Ireland allowed significant increases in emissions while other EU-member states made larger cuts;
- New Zealand, Russia and the Ukraine did not need to make any emissions cuts because they had already met or were below 1990 levels;
- Norway and Iceland were permitted to increase production by 10% and 8% over 1990 levels, respectively, because they already created a large proportion of their energy from hydroelectric and geothermal energy;
- Australia was allowed a 1% increase in emissions over 1990 levels because they otherwise threatened to boycott the agreement;

In addition to the target emissions reductions, the *Kyoto Protocol* established three mechanisms by which countries could meet their obligations through actions *outside* of their country: 1) joint implementation; 2) the Clean Development Mechanism (CDM); and 3) emissions trading. The European Union wanted a minimum of 50% of the emissions reduction to occur domestically, however, the US refused to agree to a minimum limit of domestic action. Specific discussion about ‘green building’ was not included in the Kyoto discussion; however, sustainable real estate strategies would become a key policy tool for many Annex-1 countries in meeting their targets (Dresner, 2002).

### ***Post Kyoto – A Lack of Recent Progress***

Since the *Kyoto Protocol*, it can be argued that issues related to sustainable development have taken a step backwards. At the 2002 World Summit of Sustainable Development held in Johannesburg, South Africa, the US again attempted to block agreement on targets and timetables related to emissions, sanitation access, marine protection, renewable energy and biodiversity. Although agreements to reduce the rate of biodiversity, establish marine protection areas and improve access to sanitation were agreed upon, they were non-binding and weaker than previous agreements. Most recently, the Rio+20 United Nations Conference on Sustainable Development left policy and activist groups feeling somewhat deflated. However, feedback from the corporate business community was upbeat as a result of the multitude of business-centric events that offered opportunities to share ideas and best practices, as well as make new commitments to sustainability (Makower, 2012). That begs the question, is progress toward sustainable development more apt to be made in the board room than the government policy table?

### **How Does Real Estate Factor into the Sustainability Debate?**

#### ***The Impact of Buildings on the Planet – Why Sustainable Real Estate is Important***

Buildings are inextricably linked to the sustainability debate, particularly with regard to their impact on the environment. Globally, buildings are the leading producers of CO<sub>2</sub> emissions and account for nearly 1/3 of the planet's total energy use and associated greenhouse gas emissions (Globe Alliance, 2011). The UN Intergovernmental

Panel on Climate Change estimated that building-related greenhouse gas emissions will double by the year 2030 if the then-current, high-growth development scenario continued (IPCC, 2007). Most of this growth (approximately 97%) is projected to occur in developing countries while North America and Europe will have a minimal reduction in emissions during that same time. It should be noted that without significant changes in ‘business-as-usual’ practices, the goals for the *Kyoto Protocol* emissions targets are unlikely to be met.

The United States (US) emits more CO<sub>2</sub> from fossil fuels consumption than any other country in the world, except China. In fact, the US emits 25% more than the combined emissions of Europe and more than the Middle East, Africa and Eurasia combined (US EIA, 2003). According to the US Green Building Council (USGBC), buildings contributed 39% of CO<sub>2</sub> emissions and 13.6% of total water consumption in the US. In addition, buildings in the US contributed approximately 40% of the primary energy usage and 72% of electricity consumption (USGBC<sup>1</sup>, 2010). As a percentage of total existing commercial floor space, it is estimated that 1-2% of new commercial floor space is added to the commercial building stock in the US each year. Taking this statistic into account along with the fact that approximately 75% of the existing building stock built before 1990 (Ciochetti and McGowan, 2009), it becomes clear that a move toward energy efficient, adaptive re-development on existing buildings is a necessity if the US, as well as other participating countries, are going to meet the carbon footprint goals set in the *Kyoto Protocol*.

In the United Kingdom (UK), buildings contribute 40% of the total UK carbon emissions and it is estimated that total new office and warehouse floor space will only grow 1-2% per year as a percentage of the total existing floor space (BRE Global, 2011). In addition, it is estimated that by 2050 60% of the UK building stock will have been built prior to 2010 (see Exhibit

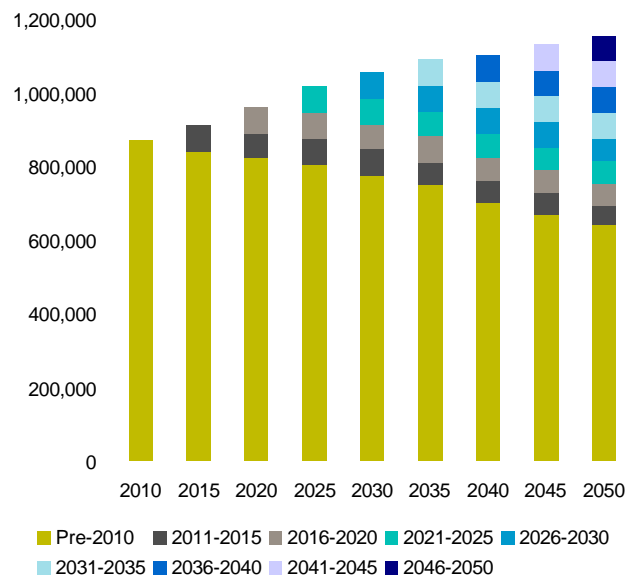


Exhibit 2.2: Age Profile of the Non-Domestic UK Building Stock Projected Through 2050. (BRE, 2010)

2.2). Therefore, improvements in the existing building stock will be necessary, in addition to new net zero-carbon buildings, if the target of 68.4 MtCO<sub>2</sub>e<sup>5</sup> reduction in CO<sub>2</sub> is to be achieved (BRE, 2010).

The Globe Alliance argues that globally buildings offer the largest and most cost effective opportunities for greenhouse gas (GHG) mitigation among the potential sectors at low, no, and even negative cost - underscoring the need for an international effort to rapidly enhance sustainable building practices to capitalize on this emission reduction. Their research indicates that by simply applying current, proven technologies, energy consumption in buildings can be reduced by 30-50%; as these technologies continue to

<sup>5</sup> MtCO<sub>2</sub>e is the standardized measurement for the amount of carbon dioxide (CO<sub>2</sub>) emissions when measuring the reduction or seclusion of emissions from the environment. MtCO<sub>2</sub>e stands for Metric Ton(ne) Carbon Dioxide Equivalent. GtCO<sub>2</sub>-eq/yr (Exhibit 2.3) stands for a Giga Ton(ne) Carbon Dioxide Equivalent emissions per year, while US\$/tCO<sub>2</sub>-eq/yr represents the cost in US dollars per ton(ne) of Carbon Dioxide Equivalent emissions per year.

increase in efficiency, Globe Alliance estimates that the residential and commercial real estate sectors can achieve up to a 29% emissions cut below projected levels by 2020, at extremely low or no cost (Globe Alliance, 2011).

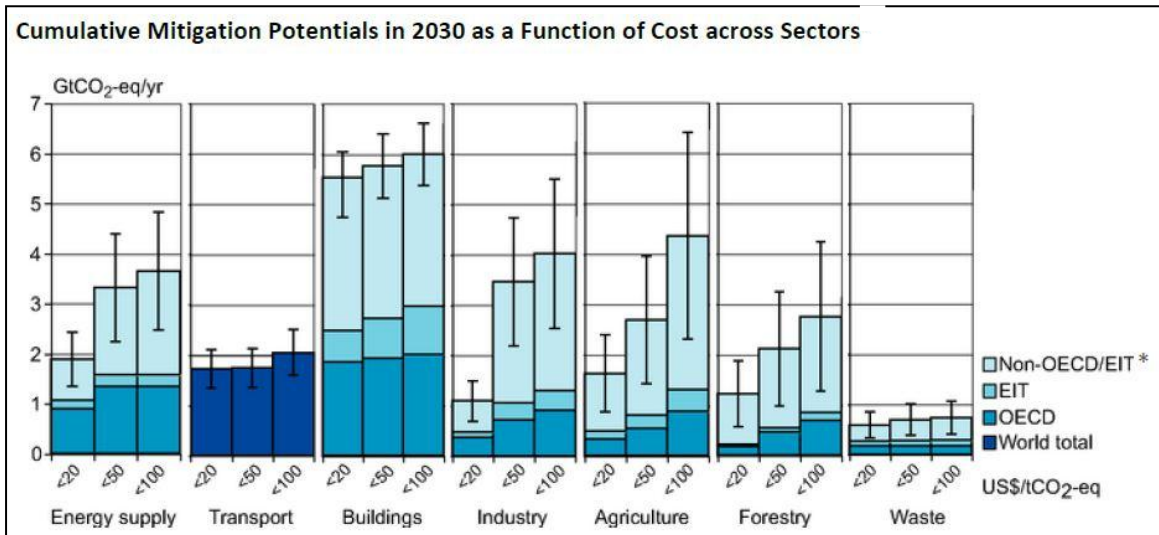


Exhibit 2.3: Cumulative Mitigation Potentials in 2030 as a Function of Cost across Sectors. Non-OECD.EIT categorizes countries that are not part of the Organization for Economic Cooperation and Development (OECD) and are not Economies in Transition (EIT) (IPCC, 2007).

Similarly, the United Nations has found that a 25% reduction of greenhouse gas emissions is possible through the creation of new green buildings and the adaption of existing buildings to include some of the green technologies that are being developed today (UNEP-SBCI, 2009). Emission reduction and the energy savings potential in buildings is relatively independent of the price of carbon; regardless of price fluctuations, savings remain relatively consistent up to \$100/ton of CO<sub>2</sub>-equivalent (Levine and Urge-Vorsatz, 2007). This fact underscores the conclusion that the building sector represents the greatest opportunity for reducing GHG emissions, as shown in Exhibit 2.3, and



highlights the need to improve sustainable building practices globally to make the most of this potential emission reduction.

Levine and Urge-Vorsatz further note that while buildings offer the largest share of cost effective opportunities for GHG mitigation among the sectors, “achieving a lower carbon future will require very significant efforts to enhance programs and policies for energy efficiency in buildings and low-carbon energy sources well beyond what is happening today” (2007: 390). The impact of energy costs directly impacts both building occupiers and owners as these costs represent 30 percent of operating expenses in a typical commercial office building – it is the largest and most manageable operating expense. Therefore, the design and operation of commercial real estate becomes critical not only for its ability to aid in the reduction of global GHG emissions, but can potentially benefit both owner and occupiers by reducing operating expenses depending on how the lease is structured.

## **BUILDING THE BUSINESS CASE FOR SUSTAINABLE DEVELOPMENT**

Architects and engineers have been investigating the issues of environmentally-sensitive, healthy design and construction for decades. However, within the real estate industry (including, among others, the investment, finance, valuation, management and development sectors) the sustainability literature is predominantly less than 10 years old. Nonetheless, property advisors, investors and appraisers are trying to come to grips with the concept of sustainability and are looking at how this emerging paradigm shift in favor of sustainability will impact the real estate industry. McCarty, Jordan and Probst note

that sustainability strategies should not be made just because we are passionate about climate change impacts, but from “a strong business case where financial and strategic drivers overlap with drivers of environmental value” (2011: 18).

The earliest sustainable real estate literature originates from within the industry and was intended to be used by practitioners (Sayce, Sundberg and Clements, 2010). Examples of these include: published company/government reports and books (Pearce, Barbier and Markandya, 1990; Banuri, 1999; Banuri and Weyant, 2001; Sustainable Construction Task Force, 2001; SCOPE 58, 2001; Lawn, 2003; Stern, 2006), presentations at professional conferences (Lutzenkendorf and Bachofner, 2002; McNamara, 2002 and 2004; Sayce and Ellison, 2003; Sayce, Ellison and Smith, 2004; Boyd and Kimmitt, 2005; Corps, 2005; Muldavin and Lowe, 2006), white papers from professional organizations (RICS, 2005; GVA Grimley, 2007a and b) and op-eds in professional journals (McNamara, 2005; Lowe and Chappell, 2007).

Although the earliest academic, peer-refereed article, St. Lawrence (2004), focused on the availability of environmentally and socially sustainable real estate in the UK corporate real estate market, the majority of academic papers published prior to 2007 focused on creating the rationale for the link between sustainability and its impact on market value (Sayce, Ellison and Smith, 2004; Reed and Wilkerson, 2005; Myers, Reed and Robinson, 2007). Among the early reports making the case for sustainable real estate was the *BRE Sustainable Construction Task Group* (2001) which, rather than making its argument based on a reduction in operating costs, focused on how sustainability can improve value through improved reputation, reduced risks and greater returns to real

estate investors. Sayce, Sunderberg and Clements (2010) provide a global review of the sustainable real estate literature through 2009. Their extensive literature review breaks down 128 real estate articles investigating the relationship between sustainability in real estate and valuation of the built asset into a variety of descriptive statistics. The research findings offer insight into the methodologies used to research sustainability issues in real estate and quantifies the frequency of each methodological approach used to conduct those studies. The authors identified only a few studies that included transactional data (11); this is unsurprising in that sustainable real estate is a relatively recent asset type and there has therefore been little data available for researchers to use in transactional research. Instead, the majority of research studies were literature based (35), followed by theoretical (27) and attitudinal (24) studies.

### **Non-Empirical/Qualitative Studies**

After 2007, the primary focus of peer-refereed, academic articles continues to focus on the impact of sustainability on market value; however, the scope of both the concept of sustainability *and* the methods employed to conduct the research has expanded significantly. Sayce, Sunderberg and Clements (2010) note a significant increase in studies by property advisors aimed at understanding the market trend toward sustainability in commercial real estate, as well as how sustainability will impact their clients' future business performance (e.g. Cushman and Wakefield, 2009; Jones Lang LaSalle, 2008). By undertaking these studies, property specialists are raising awareness about sustainability among the investors, management, occupiers and developers of

commercial real estate. Furthermore, recent studies by the investment community evaluating approaches for integrating sustainable design and operation strategies into risk analysis (McNamara, 2005 and 2008; Lutzkendorf and Lorenz, 2007) has significant potential to engage investors in the sustainable real estate debate, particularly those who are on the fence with regard to how sustainability issues impact their fiduciary obligations.

There has also been an increase of traditional case studies on the costs and benefits of sustainable real estate (Kats, 2003; Matthiessen and Morris, 2007; Chappell and Corps, 2009); theoretical publications offering guidance for development of strategies and principles for sustainable and socially responsible real estate development and investment (Pivo and McNamara, 2005; Lutzkendorf and Lorenz, 2005 and 2009; Rapson, Shiers, Roberts and Keeping, 2007; Lowe and Ponce, 2009); publications investigating the criteria and indicators for sustainability assessment using literature reviews, surveys, the Delphi Method, interviews and focus groups/workshops (Sayce and Ellison, 2003; Kimmet and Boyd, 2004; Pivo, 2008; Reed, Bilos, Wilkinson and Schulte, 2009; Ellison and Brown, 2010; Muldavin, 2010); and publications investigating productivity among tenants through surveys and literature reviews (Kats, 2007; Myers, Reed and Robinson, 2007; Pivo, 2007; Miller, Pogue, Gough and David, 2009).

The appraisal industry has also jumped onto the bandwagon with recent publications using case studies, interviews, literature reviews and traditional quantitative methods associated with valuation to assess how sustainability is best integrated into property valuation theory and practice (Lorenz and Lutzkendorf, 2008; Lutzkendorf and

Lorenz, 2005); how sustainability concerns are reported within their valuations (Chappell and Lowe, 2007) and how to capture individual sustainability attributes' impact on value (Chappell and Corps, 2009; Muldavin, 2010; Myers, Reed and Robinson, 2007).

As research in sustainable real estate is still young, many of the aforementioned publications are disseminating research endeavors that are exploratory and/or descriptive. As such, many of the methods used to gather the data are predominately qualitative in nature. The use of qualitative methods, particularly for studies related to user behavior and productivity, enables researchers to acquire data with greater depth than a traditional survey might. For some, the qualitative data is further analyzed using a form of quantitative analysis – primarily regression modeling. One exception among the reviewed publications mentioned above is Kats (2003), who utilized a traditional, quantitatively-focused cost/benefit analysis.

## **Empirical Studies**

The first empirical studies related to sustainable commercial real estate have also only been completed within the last decade (Miller, Spivey and Florance, 2008 and 2010; Eichholtz, Kok and Quigley, 2010a; Fuerst and McAllister, 2011). These studies all utilize the CoStar Property database as their primary source of data and analyze the data through hedonic modeling. These seminal empirical studies find, to varying degrees, that

buildings with ‘green’ certifications (primarily LEED and EnergyStar in the US<sup>6</sup>) command rental rate and effective rental rate premiums, sales price premiums, and increased occupancy rates. In addition, Miller, Spivey and Florance (2008) find a reduction in capitalization rates, Eichholtz, Kok and Quigley (2010a) find that premiums in EnergyStar buildings are tied directly to the energy performance of the property, and Fuerst and McAllister (2011) find that ‘green’ certified buildings have a lower instance of using net leases than the comparable properties without ‘green’ certifications and that the level of LEED certification impacts rental rate and sales price premiums. For specific data collection methods, analyses methods used and results for the aforementioned studies, as well as those that follow, see Exhibit 2.4.

Pivo and Fisher (2010) was the first empirical study to use data from the National Council of Real Estate Investment Fiduciaries (NCREIF) database to investigate the income, value and returns that are associated with socially responsible property investment (RPI). The study includes a sample of 1,199 properties (with a total market value of \$98 billion) and the data spans from 1999 to 2008. The researchers consider both EnergyStar certified buildings and regeneration properties located in suburban and CBD zones. The authors ran a series of regression models and controlled for interregional location and accessibility conditions, regional economic conditions, specific building location, quality and physical characteristics. The findings support the results of previous

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<sup>6</sup> A comprehensive list of ‘green’ building assessment rating systems is provided in Exhibit A-1 in Appendix A. Those most frequently used in this chapter include: BREEAM – British Research Establishment (BRE) Environmental Assessment Method; LEED – Leadership in Energy and Environmental Design and LEED EBOM - Existing Buildings: Operations and Maintenance; EnergyStar, which rates energy performance of buildings in the US; GreenStar and NABERS, the equivalent of LEED and EnergyStar in Australia.

studies with regard to ‘green’-certified buildings generating increased occupancy rates (1.3% for EnergyStar buildings), sales price premiums (8.5% for EnergyStar buildings) and net operating income (NOI) (2.7% for EnergyStar buildings) as well as reduced utility costs (12.9% reduction in EnergyStar buildings) and capitalization rates (0.052% reduction for EnergyStar buildings). The study also found RPI-related characteristics to have a positive impact on sales price (a 9.2% increase) for properties located near transit lines and in or near urban regeneration zones.

Wiley and Benefield (2010) use 7,308 EnergyStar- and LEED-certified buildings selected from the CoStar Property database and 1,151 sales transactions listed in the CoStar COMPS database to investigate the relationship between energy-efficient design and leasing/sales premiums. The study utilizes both a two-stage least squares (2SLS) approach and an ordinary least squares (OLS) approach, each with controls for location, lease types and physical characteristics of the property, to analyze the data. Their findings also further support the growing literature which indicates that ‘green’ certified buildings command rental rates and sales price premiums.

Within the last two years, additional empirical studies have followed the trends seen in the larger body of non-empirical literature and authors have expanded their research scope beyond just the implication of sustainability on real estate market value. Eichholtz, Kok and Quigley (2010b) used the CoStar Tenant Module to investigate decision-making determinants used by firms in green leasing decisions. Not yet

| Exhibit 2.4: Key Theoretical and Empirical Sustainable Real Estate Research<br>Data, Methods, and Findings |  |   |   |  |
|--|--|---|---|--|
| Author(s) &<br>Publication Year  | Publication/ Report  | Data  | Methods   | Findings/Notes   |
| Ellison, L., Sayce, S.,<br>and Smith, J. (2007)  | Socially responsible<br>property investment:<br>Quantifying the<br>relationship between<br>sustainability and<br>investment property<br>worth.<br><br><i>Journal of Property<br/>Research</i> , 24(3): 191-219.  | <ul style="list-style-type: none"> <li>• 2006-2009</li> <li>• Previous Literature/Research</li> <li>• Questionnaire &amp; Focus Group questions focus on seven sustainability criteria</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Literature Review</b></li> <li>• <b>2 Case Study Appraisals</b></li> <li>• <b>Future Proofing Property Questionnaire (FPPQ)</b></li> <li>• <b>Focus Groups</b></li> </ul> | <ul style="list-style-type: none"> <li>• <b>Sustainability Appraisal Tool</b></li> <li>• Theoretically demonstrates it is possible to quantify impact of certain elements of sustainability characteristics on investment value</li> </ul>   |
| Myers, G., Reed, R.,<br>and Robinson, J.<br>(2007)   | The relationship between<br>sustainability and the<br>value of office buildings.<br><br>13th Annual Pacific Rim<br>Real Estate Conference<br>21 - 24 January 2007<br>Curtin University of<br>Technology, Perth. WA<br><br><a href="http://www.prres.net/papers/MyersReed&amp;Robinson">www.prres.net/papers/MyersReed&amp;Robinson</a> |   | <ul style="list-style-type: none"> <li>• <b>Extensive Literature Review</b></li> </ul>  | <ul style="list-style-type: none"> <li>• Previous research suggests that sustainable criteria impact the valuation equation through rental growth, depreciation, risk premium and cash flow</li> <li>• Examines how other studies have viewed the impact of sustainable criteria and how they are weighted within the valuation equation</li> <li>• Provides sustainability and office building insights with emphasis on valuation</li> <li>• Seeks to assess a hypothetical purchaser's perspective</li> </ul> |



| Key Theoretical and Empirical Sustainable Real Estate Research<br>Data, Methods, and Findings – continued |   |   |  |  |
|---|---|---|--|--|
| Author(s) &<br>Publication Year   | Publication/ Report   | Data  | Methods  | Findings/Notes   |
| Pivo, G. (2008)   | Responsible property investment criteria development using the Delphi Method.<br><br><i>Building Research &amp; Information</i> , 36(1), 20-36.<br><br><a href="http://www.u.arizona.edu/RPIcriteriaDevelopedUsingDelphi">www.u.arizona.edu/RPIcriteriaDevelopedUsingDelphi</a> | <ul style="list-style-type: none"> <li>Panelists</li> <li>Purposefully selected based on participation in previous SRI conferences or RPI workshops or enrolled in the RPI listserv.</li> <li>Purposefully selected to represent:               <ul style="list-style-type: none"> <li>High level of expertise</li> <li>A variety of backgrounds</li> <li>Diversity in gender, ethnicity and nationality</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li><b>Delphi Method</b> –               <ul style="list-style-type: none"> <li>Using 3-rounds of emailed surveys</li> <li>Collected demographic information to address potential selection biases</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li></li> </ul>   |
| Miller, N., Spivey, J. and Florance, A. (2008)  | Does green pay off?<br><br><i>Journal of Real Estate Portfolio Management</i> , 14:4, 385-99.<br><br><a href="http://www.sandiego.edu/EconomicsOBeingGreen.pdf">www.sandiego.edu/EconomicsOBeingGreen.pdf</a>   | <ul style="list-style-type: none"> <li>Co-Star database</li> <li>2004 3Q – 2008 1Q</li> <li>643 EnergyStar and 2000 non-EnergyStar</li> <li>Class-A multi-tenanted office buildings, five stories or more, built after 1970, 200,000+ sq.ft</li> <li>LEED vs. non-LEED – 580? – paper unclear how many LEED buildings</li> </ul>  | <ul style="list-style-type: none"> <li><b>Descriptive analysis of data and regression model</b></li> <li>Critiqued by Muldavin (2008) as having sampling and methodological issues and therefore the reliability of results should be considered.</li> </ul> | <ul style="list-style-type: none"> <li>Faster absorption rates for LEED-rated buildings except 2006 2Q.</li> <li><b>Sales Price Premium:</b> <ul style="list-style-type: none"> <li>9.94% for LEED</li> <li>5.76% for EnergyStar</li> </ul> </li> <li><b>Rental Rate Premium:</b> <ul style="list-style-type: none"> <li>\$2.50/sq.ft. premium for LEED-rated buildings in 2007</li> </ul> </li> </ul> |

| Key Theoretical and Empirical Sustainable Real Estate Research<br>Data, Methods, and Findings – continued |  |   |  |  |
|---|--|---|--|--|
| Author(s) &<br>Publication Year   | Publication/ Report  | Data  | Methods  | Findings/Notes   |
| Chappell, T.W. and<br>Corps, C. (2009)  | <p><i>High performance green building: What's it worth? Investigating the market value of high performance green buildings.</i></p> <p>Seattle: Cascadia Chapter of the US Green Building Council.</p> <p><a href="http://cascadiagbc.org/GBValue">cascadiagbc.org/GBValue</a></p> | <ul style="list-style-type: none"> <li>• Alley 24 East, Seattle, WA</li> <li>• 200 Market Place, Portland, OR</li> <li>• Vancouver Centre, Vancouver, BC</li> </ul> | <ul style="list-style-type: none"> <li>• <b>3 Case Valuation Studies</b> <ul style="list-style-type: none"> <li>• Conducted inspections</li> <li>• Completed primary &amp; secondary market research</li> <li>• Gathered information on green strategies employed at properties</li> <li>• Interviews</li> <li>• Comparisons of property specific data to broader market data</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• <b>'Green' properties</b> appear to have: <ul style="list-style-type: none"> <li>• Improved marketing abilities (as indicated by higher occupancy rates).</li> <li>• Lower energy consumption.</li> <li>• Lower operating costs.</li> <li>• Reduced risk.</li> </ul> </li> <li>• <b>Green leases</b> could further improve value of green investments.</li> </ul> |
| Investment Property Forum (IPF) Research Programme 2006-2009. (October, 2009)                             | <p><i>ISPI (UK): Creating a sustainable property investment index: Methodology and initial results.</i></p> <p>London: Investment Property Forum.</p>  | <ul style="list-style-type: none"> <li>• IDP UK Databank</li> <li>• 2006-2009</li> </ul>  | <ul style="list-style-type: none"> <li>• <b>Analysis</b> of financial performance</li> <li>• <b>Creation</b> of a prototype.</li> <li>• <b>Survey</b> of fund managers.</li> <li>• <b>Finalizing</b> questions for the coding framework</li> <li>• <b>Develop</b> weighting scale</li> </ul>   | <ul style="list-style-type: none"> <li>• Identified criteria and indicators relevant to both sustainability and property.</li> <li>• Proposed weighting process for criteria and indicators.</li> <li>• Developed and tested a framework for real estate sustainability coding to enable classification of bldgs.</li> </ul>   |

**Key Theoretical and Empirical Sustainable Real Estate Research  
Data, Methods, and Findings – continued**

| <b>Author(s) &amp;<br/>Publication Year</b>          | <b>Publication/ Report</b>   | <b>Data</b>   | <b>Methods</b>  | <b>Findings/Notes</b>   |
|--|--|---|---|---|
| Miller, N., Spivey, J.<br>and Florance, A.<br>(2010) | Does green still pay off?<br><a href="http://www.josre.com">www.josre.com</a>  | <ul style="list-style-type: none"> <li>• CoStar database</li> <li>• 2010 sales</li> <li>• 378 Class-A commercial office buildings.</li> </ul>   | <ul style="list-style-type: none"> <li>• <b>Descriptive analysis of data and regression model</b></li> </ul>  | <ul style="list-style-type: none"> <li>• <b>LEED</b> – still shows rental premium; higher vacancy rates (perhaps due to delivery timing); office prices/sq.ft. higher than market.</li> <li>• <b>EnergyStar</b> – rents in line with market; vacancy rates below market; office sales prices/sq.ft. below market.</li> </ul>  |
| Eichholtz, P., Kok, N., and Quigley, J.M.<br>(2010)  | Doing well by doing good? Green office buildings.<br><br><i>American Economic Review 100 (December 2010): 2494-2511</i><br><br><a href="http://www.ucei.berkeley.edu/PDF/csemwp192.pdf">http://www.ucei.berkeley.edu/PDF/csemwp192.pdf</a> | <ul style="list-style-type: none"> <li>• CoStar database</li> <li>• 2004 – 2007 3Q</li> <li>• Sample –               <ul style="list-style-type: none"> <li>• 694 LEED &amp; 1,045 EnergyStar</li> <li>• 199 of which included transaction information.</li> </ul> </li> <li>• Control Sample – located within 0.2 square miles.               <ul style="list-style-type: none"> <li>• 8,105 rental rate observations</li> <li>• 1,813 observations with transaction information.</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• <b>Hedonic framework &amp; GIS</b> - with controls for location, demand and physical characteristics.</li> <li>• Used semilog equations</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Green Certification Premium:</b> <ul style="list-style-type: none"> <li>• 11% occupancy rates</li> <li>• 2.8-3.5% rental rates/ sq.ft.</li> <li>• 7% effective rents/ sq.ft.</li> <li>• 15.8-16.8% sales prices/ sq.ft. for EnergyStar rated buildings</li> </ul> </li> <li>• <b>EnergyStar Premium:</b> premiums tied to energy performance, intangibles may also factor.</li> </ul> |

| Key Theoretical and Empirical Sustainable Real Estate Research<br>Data, Methods, and Findings – continued |   |  |   |   |
|---|---|--|---|---|
| Author(s) &<br>Publication Year   | Publication/ Report   | Data   | Methods   | Findings/Notes  |
| Eichholtz, P., Kok, N., and Quigley, J.M. (2010)<br><br>(2009) presentation publication                   | Why companies rent green: CSR and the role of real estate.<br><br><i>Academy of Management Annual Meeting Proceedings</i> , 1-6<br><a href="http://escholarship.org/uc/">http://escholarship.org/uc/</a>  | <ul style="list-style-type: none"> <li>• CoStar Tenant Module</li> <li>• 2004-2007 2Q - June, 2009</li> <li>• Sample – 3,179 tenants in 1,180 ‘green’ office buildings in the US.</li> <li>• Control Sample – 8,000 tenants in 4,390 conventional office buildings within .25 miles radius of subject buildings in the US.</li> </ul>  | <ul style="list-style-type: none"> <li>• <b>Limitation</b> – study was able to test firm motivations on industry level only.</li> <li>• <b>Descriptive Statistics</b> supported by results from <b>regression analysis</b></li> </ul>   | <ul style="list-style-type: none"> <li>• Tested hypotheses relating to <b>determinants of corporate green housing decisions</b> as:               <ul style="list-style-type: none"> <li>• Competitiveness</li> <li>• Legitimization</li> <li>• Environmental responsibility</li> <li>• Mixed motivations</li> </ul> </li> </ul>  |
| Pivo, G. and Fisher, J. (2010)  | Income, value and returns on socially responsible property investment.<br><br><i>Journal of Real Estate Research</i> , 32, 243-269.<br><br><a href="http://www.u.arizona.edu/Pivo&amp;FisherInvestmentReturnsFromRPI">www.u.arizona.edu/Pivo&amp;FisherInvestmentReturnsFromRPI</a> | <ul style="list-style-type: none"> <li>• NCREIF database</li> <li>• Quarterly data from 1999-2008</li> <li>• Sample – 1,199 properties with \$98 billion total market value.</li> <li>• Regression observations – ranged from 6,000-7,500 depending on specific variables used because of missing data for some properties.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Hedonic Regression Model</b> – with controls for regional economic conditions, interregional location and accessibility conditions, building location, quality and physical characteristics.</li> <li>• <b>RPI characteristics</b> – near transit and in or near urban regeneration zones.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>EnergyStar premiums:</b> <ul style="list-style-type: none"> <li>• 1.3% occupancy rate</li> <li>• 8.5% market value/sq.ft.</li> <li>• 2.7% NOI/sq.ft.</li> <li>• -12.9% utility costs/sq.ft.</li> <li>• .052% lower cap rate</li> </ul> </li> <li>• <b>Regeneration Property premiums in CBD zones:</b> <ul style="list-style-type: none"> <li>• 0.2% occupancy rate</li> <li>• 6.7% market value/sq.ft.</li> <li>• 9.1% market value/sq.ft. when near transit</li> <li>• 8.2% NOI/sq.ft.</li> </ul> </li> </ul> |

| Key Theoretical and Empirical Sustainable Real Estate Research<br>Data, Methods, and Findings – continued                 |  |   |  |   |
|---|--|---|--|---|
| Author(s) &<br>Publication Year   | Publication/ Report  | Data  | Methods  | Findings/Notes  |
| Wiley, J.A. &<br>Benefield, J.D. and<br>Johnson, K.H. (2010)  | Green design and the<br>market for commercial<br>office space.<br><br><i>Journal of Real Estate<br/>Finance and Economics</i> ,<br>41:228-243                                      | <ul style="list-style-type: none"> <li>• Data collected January 9, 2008.</li> <li>• CoStar Property database               <ul style="list-style-type: none"> <li>• 7,308 LEED &amp; EnergyStar                   <ul style="list-style-type: none"> <li>• Class A office properties</li> <li>• 46 U.S. markets.</li> </ul> </li> </ul> </li> <li>• CoStar COMPS databases               <ul style="list-style-type: none"> <li>• 1,151 sales transactions in 25 U.S. office markets</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• <b>2-stage least squares approach &amp; ordinary least squares approach.</b> <ul style="list-style-type: none"> <li>• Office Space Rental</li> <li>• Office Building Sales</li> </ul> </li> <li>• Controls - for location, lease types and physical characteristics.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Rent premium –</b> <ul style="list-style-type: none"> <li>• LEED – 15.2-17.3%</li> <li>• EnergyStar – 7.3-8.9%</li> </ul> </li> <li>• <b>Occupancy rates increased:</b> <ul style="list-style-type: none"> <li>• LEED – 16.2-17.9%</li> <li>• EnergyStar – 10-11%</li> </ul> </li> <li>• <b>Sales price premium –</b> <ul style="list-style-type: none"> <li>• LEED – \$129.18/sq.ft</li> <li>• EnergyStar – \$29.71/sq.ft</li> </ul> </li> </ul> |
| Ellison, L. and<br>Brown, P. (2010)<br><br><i>Conference paper presentation ,<br/>presented at ERES<br/>Milan. (2008)</i> | Sustainability metrics for<br>commercial real estate<br>assets: Establishing a<br>common approach.<br><br><i>Journal of European Real<br/>Estate Research</i> , 4(2): 113<br>- 130 | <ul style="list-style-type: none"> <li>• Thirteen different reporting systems and eleven sets of company accounts.</li> <li>• Focused on five key variables – building details, energy, carbon, water and waste.</li> </ul>   | <ul style="list-style-type: none"> <li>• <b>Literature Review</b></li> <li>• <b>Workshops</b> with practitioners.</li> </ul>   | <ul style="list-style-type: none"> <li>• <b>Identified</b> most common variables and metrics used to measure the variables as well as normalizing factors used to report sustainability in CRE.</li> <li>• <b>Noted need for cross industry agreement on a standard</b> set of sustainability variables and metrics - for comparison, benchmarking &amp; reporting.</li> </ul>  |

| Key Theoretical and Empirical Sustainable Real Estate Research<br>Data, Methods, and Findings – continued |   |  |  |  |
|---|---|--|--|--|
| Author(s) &<br>Publication Year   | Publication/ Report   | Data   | Methods  | Findings/Notes   |
| Fuerst, F. and<br>McAllister, P. (2011)   | Green noise or green<br>value? Measuring the<br>price effects of<br>environmental<br>certification in<br>commercial buildings.<br><br><i>Real Estate Economics</i> ,<br>39(1), 45-69.<br><br><a href="http://hotellaw.jmbm.com/GreenNoiseOrGreenValue?">hotellaw.jmbm.com/GreenNoiseOrGreenValue?</a> | <ul style="list-style-type: none"> <li>• CoStar database</li> <li>• 1999-2008 4Q</li> <li>• Benchmark Sample – 24,479 office buildings in 853 submarkets in 81 US metro areas</li> <li>• Sample – 626 LEED &amp; 1,282 Energy Star buildings</li> <li>• Certified Sample – <ul style="list-style-type: none"> <li>• 9,806 with transaction price observations;</li> <li>• 18,519 with asking rent observations;</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• <b>2 Hedonic regression models</b> – one for rents, one for transaction prices</li> <li>• Controls included for location, physical and lease characteristics.</li> <li>• Numeric values were transformed into log values.</li> <li>• Authors note caveats to results in conclusions.</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Rent Rate Premium:</b> <ul style="list-style-type: none"> <li>• LEED – 5%</li> <li>• EnergyStar – 4%</li> </ul> </li> <li>• <b>Sales Price Premium –</b> <ul style="list-style-type: none"> <li>• LEED – 25%</li> <li>• EnergyStar – 26%</li> </ul> </li> <li>• <b>Occupancy Rates increased:</b> <ul style="list-style-type: none"> <li>• LEED – N/A</li> <li>• EnergyStar – 1-3%</li> </ul> </li> <li>• <b>Properties Using Net Leases:</b> <ul style="list-style-type: none"> <li>• LEED (10%) &amp; EnergyStar (12%) vs. Comps (22%)</li> </ul> </li> <li>• Premium is impacted by level of LEED certification.</li> </ul> |
| Kok, N., Miller, N.,<br>and Morris, P.<br><br><i>Draft – shared by author</i>                             | The economics of green retrofits.<br><br><i>Unpublished</i>   | <ul style="list-style-type: none"> <li>• CoStar database</li> <li>• 2005-2010</li> <li>• 374 LEED EBOM buildings in 14 US markets managed by 314 property managers.</li> <li>• Renovation period: 2005-2009</li> <li>• Certifications from 2008-2011</li> <li>• 600- control properties</li> </ul>   | <ul style="list-style-type: none"> <li>• <b>Regression Model</b></li> </ul>  | <b>LEED EBOM buildings:</b> <ul style="list-style-type: none"> <li>• Vacancy rates were higher in LEED EBOM group prior to 2005, and are still lagging slightly.</li> <li>• \$2/sq.ft./year = \$25/sq/ft value impact for EBOM.</li> <li>• 7.1% rental premium</li> </ul> <b>Renovation Strategies</b><br>identified that pay of well.   |

| Key Theoretical and Empirical Sustainable Real Estate Research<br>Data, Methods, and Findings – continued |  |   |   |   |
|---|--|---|---|---|
| Author(s) &<br>Publication Year   | Publication/ Report  | Data  | Methods   | Findings/Notes  |
| Newell, G.,<br>MacFarlane, J., Kok,<br>N. (2011)  | <i>Building better returns.</i><br><br>Sydney: The Australian<br>Property Institute.<br><br><a href="http://www.nsw.api.org.au">www.nsw.api.org.au</a> | <ul style="list-style-type: none"> <li>• Jones Lang LaSalle and CBRE provided data for Green Star and NABERS rated office buildings in Sydney and Canberra.</li> <li>• <b>Buildings with quality ratings of:</b> <ul style="list-style-type: none"> <li>• Premium • B</li> <li>• A • C</li> </ul> </li> <li>• <b>206 NABERS rated buildings:</b> <ul style="list-style-type: none"> <li>• 90 in Sydney CBD</li> <li>• 91 in Sydney suburban</li> <li>• 25 in Canberra</li> </ul> </li> <li>• <b>160 non-NABERS rated buildings:</b> <ul style="list-style-type: none"> <li>• 58 in Sydney CBD</li> <li>• 69 in Sydney suburban</li> <li>• 33 in Canberra</li> </ul> </li> <li>• <b>23 4-6 Star Green Star buildings:</b> <ul style="list-style-type: none"> <li>• 5 in Sydney CBD</li> <li>• 9 in Sydney suburban</li> <li>• 9 in Canberra</li> <li>• 10 4★ buildings</li> <li>• 11 5★ buildings</li> <li>• 2 6★ buildings</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>• <b>Hedonic Regression Model</b> – with controls for size, building quality, and location.</li> </ul> | <p><b>Green Star Rating:</b></p> <ul style="list-style-type: none"> <li>• 5% gross rent premium</li> <li>• 11.7% value premium</li> <li>• 0.6% vacancy reduction</li> <li>• -.02% yield reduction</li> <li>• 1.3% out-goings reduction</li> </ul> <p><b>NABERS Energy Ratings</b></p> <p><b>5-Star Rating:</b></p> <ul style="list-style-type: none"> <li>• 0.6% gross rent premium</li> <li>• 8.7% value premium</li> <li>• 5.7% vacancy reduction</li> <li>• .15% yield reduction</li> <li>• 6.5% out-goings reduction</li> </ul> <p><b>3/3.5 - 4/4.5 Star Rating:</b></p> <ul style="list-style-type: none"> <li>• 0.2-(-0.3)% gross rent premium</li> <li>• 2.5-2.6% value premium</li> <li>• 4.7-6.7% vacancy reduction</li> <li>• .04-.05% yield reduction</li> <li>• (-1.7)-2.7% out-goings reduction</li> </ul> |

| Key Theoretical and Empirical Sustainable Real Estate Research<br>Data, Methods, and Findings – continued |   |   |   |   |
|---|---|---|---|---|
| Author(s) &<br>Publication Year   | Publication/ Report   | Data  | Methods   | Findings/Notes  |
| Miller, N. and Pogue, D.<br><br><i>Presentation made at GreenBuild in Toronto, October, 2011</i>          | Do green buildings make dollars & sense? Green building study 3.0<br><br><i>Unpublished</i><br><br><a href="http://www.scribd.com/Do-Green-Buildings-Make-Dollars-and-Sense/Draft-Nov-10-2009">www.scribd.com/Do-Green-Buildings-Make-Dollars-and-Sense/Draft-Nov-10-2009</a> | <ul style="list-style-type: none"> <li>• CBRE-managed office space</li> <li>• 721 tenant respondents (of 2,500 surveyed) = 58,638,539 sq.ft. in 147 buildings nationwide</li> </ul> | <ul style="list-style-type: none"> <li>• <b>Survey</b></li> </ul> | <p><b>LEED-certified buildings:</b></p> <ul style="list-style-type: none"> <li>• Increased demand</li> <li>• Increased value</li> <li>• Higher rental rates</li> <li>• Increased occupancy by 2.4% since 2009 (better than the overall market)</li> <li>• # of LEED certified buildings has increased by 35% since 2009</li> <li>• LEED EB outpacing LEED NC (since 2009)</li> </ul> <p><b>EnergyStar:</b></p> <ul style="list-style-type: none"> <li>• Average scores increased by 6.7% since 2009</li> </ul> <p><b>CSR and Governance:</b></p> <ul style="list-style-type: none"> <li>• Larger firms demonstrate higher participation in sustainability practices</li> <li>• Approximately 1/3 of respondents have formal written policies with sustainable goals</li> <li>• 36% of respondents have staff dedicated to environmental and/or sustainability issues</li> </ul> |



published, Kok, Miller and Morris (draft provided by author) use 2005-2010 CoStar data, including 374 LEED EBOM certified buildings and 600 control properties, to investigate the economics of green retrofits. These researchers find that often renovation strategies do pay off, and preliminary results further support previous findings that ‘green’-certified buildings command rental rate premiums, in this study they were of 7.1%. Another research effort by Miller and Pogue that is currently underway incorporates a nation-wide survey of 721 tenants in 147 CBRE-managed office properties (preliminary results were presented at the Toronto GreenBuild in October, 2011). These researchers are investigating whether or not ‘green’ building features make “dollars and sense” from a tenant’s perspective. At this point in time, the survey instrument has been completed and includes questions for the tenants relating to their participation in sustainability practices, their integration of sustainability practices into formal written policies, the use of ‘Green Teams’ to guide sustainability efforts within the firm, and the tenant’s dedication level to environmental issues. In addition, there are lease related questions.

To date, most of the literature focuses on the financial implications of sustainable real estate in the US. Notable exceptions are the work done by Wilkinson (2008 and 2011a), who examined the benefits of incorporating sustainability into retrofit decisions in Australia; Miller and Buys (2008), who examined the benefits of retrofits from the perspective of tenants in Australia; Newell, MacFarlane and Kok (2011), who partnered with industry to explore the transferability of premium studies from the US to Australia; and Wilkinson (2011b and 2012), who examined the increasing importance of

environmental attributes in commercial retrofit decisions in Australia<sup>7</sup>. Newell, MacFarlane and Kok (2011), examined whether the empirical findings from the US (discussed above) were transferable to Australia. Because no database like CoStar or NCREIF exists in Australia, lack of available data has previously kept researchers in the UK and Australia from undertaking empirical studies to validate the linkage between sustainability and market value. To overcome the ‘lack of available data’ hurdle, the Australia Property Institute collaborated with industry partners Jones Lang LaSalle and CBRE to gather similar data to what is part of the US based data sets. The study was limited to NABERS- and Green Star-certified office buildings (ranging from premium- to C-class office buildings) in Sydney and Canberra, with 90 properties in the Sydney CBD, 91 properties in suburban Sydney and 25 properties in Canberra, respectively. The authors ran several hedonic models - controlling for building size, quality and location to determine if the findings indicating rental rate and sales price premiums for ‘green’ buildings in the US was also applicable in Australia. Overall, the findings are in line with the results found in the US-based studies. A strength of the study is that they were able to input the specific level of NABERS and Green Star rating acquired for each building (in contrast to the US-based studies which have tended to use any level of LEED certification as a dummy variable for ‘green building’). The study provided findings first for the entire Australian sample and then for the individual geographic markets, offering interesting insight into potential sustainable real estate investment strategies in a broader

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<sup>7</sup> Use of the Building Permit Database from the Building Commission of Victoria, Australia enabled Wilkinson (2011) to complete the most comprehensive analysis of building adaptation events in Australia relating building adaption with property attributes.

sense. In addition, the findings provide evidence about the extent of the premiums industry practitioners can expect to see when investing in Sydney or Canberra.

It is important to note that all of the empirical studies to date have used one or more of the building environmental assessment ratings (BREEAM, LEED, NABERS or Green Star) as dummy variables to capture the ‘sustainable design’ attribute or variable in their hedonic models. No studies to date have separated out individual sustainable attributes to determine their individual impact on value. This could be for several reasons. Based on the non-empirical publications reviewed, there is still a lack of consistency among the criteria and indicators used to assess sustainable real estate (Ellison and Brown, 2010; Sayce, Sundberg and Clements, 2010). The Global Reporting Index (GRI) has just issued a *G4, Real Estate and Construction Supplement*; perhaps this will begin to make strides toward that goal in that many of the top tier companies use Global Reporting Initiative guidelines as their standard for performance measurement and reporting.

### **The Cost Debate – Is Developing Sustainable Real Estate More Expensive?**

The most common objection to building ‘green’ and obtaining one of the green certifications is the increased cost of obtaining that certification in terms of actual construction costs as well as certification costs. Green building skeptics continue to argue that it's difficult or even impossible to build green without paying a big cost premium; however, case study examples continue to show that LEED-certification can be

obtained for an average of only two percent more in upfront costs. Some case studies even indicate that the total costs can be below standard market construction costs (see National Resources Defense Council (NRDC) and US Green Building Council (USGBC) websites for these case studies). This is supported by Ciochetti and Gowan (2009) who found that the minimal upfront costs can be easily recouped through economic gains associated with energy efficiency improvements in existing real estate stock.

Recent studies have persuasively made the argument that “there is no significant difference in average cost for green buildings as compared to non-green buildings” (Matthiessen and Morris, 2007: 3). In this study, Matthiessen and Morris (2004) measured the square-foot construction cost of 61 buildings seeking LEED certification and compared them with the cost to build similar types of buildings that did not specifically aim for sustainability as part of the design process requirements. Controlling for a range of factors including climate, location, market conditions and local building standards, the study found that there was little to no budgetary impact for pursuing LEED certification. The study was replicated two years later and results were similar. The study also indicated that including experienced green building professionals in the decision-making process can provide design and construction teams a way to manage overall costs; re-use of the methodology by design and construction team over multiple projects can result in the elimination of any green premiums in the construction costs as early as your second green building project. In addition, findings from the growing number of empirical studies using performance data for LEED certified buildings (detailed earlier in this literature review) indicate that rental premiums, faster lease-up

rates and increased sales prices can help offset extra upfront costs and costs associated with the learning curve of building green buildings over time.

## **SUSTAINABILITY DECISION-MAKING IN THE REAL ESTATE INDUSTRY**

### **Corporate Social Responsibility and Socially Responsible Investment**

Increased globalization has meant that business and economies have been increasingly impacted by the proliferation and severity of extreme weather events around the world which are increasingly being linked to climate change (NOAA and BAMS, 2011). The complexities and interdependencies inherent in the global market place can be highlighted by the impact of Thailand-based floods on Intel (with a loss of \$1 billion in revenues) and the Japanese automotive industry (with a loss of \$450 million in profits) (CDP, 2012). The Carbon Disclosure Project (CDP) notes that “enabling better decisions by providing investors, companies and governments with high quality information on how companies are managing their response to climate change and mitigating the risks from natural resource constraints has never been more important” (ibid: 3). The integration of non-financial considerations in the decision-making process is commonly referred to as corporate social responsibility (CSR).

Contrary to early arguments that social responsibility adversely affects a firm’s financial performance (Friedman, 1980), Mintzberg (1983) argues that corporate social responsibility is a necessity if our society and economy are to continue to thrive. Building on this idea, Coleman (1988) introduces the concept of social capital as a measurement of value. Soon, thereafter, in response to the Exxon-Valdez disaster, a

group of North American investors combined to form the advocacy group, Ceres. Acting in a coalition with environmental groups, Ceres has leveraged their collective power to encourage companies and capital markets to incorporate environmental and social concerns into their strategic decision-making. Today, the Ceres coalition represents one of the world's strongest investment groups, with over 60 institutional investors from the U.S. and Europe, managing over \$4 trillion in assets ([www.ceres.org](http://www.ceres.org)). Their formation was the beginning of the Socially Responsible Investment (SRI) movement.

Socially Responsible Investment (SRI) is also known as sustainable, socially conscious, 'green' or ethical investing. SRI is any investment strategy seeking to consider not only financial returns but also the Environmental Justice, Social Justice and Corporate Governance (ESG) issues of a company. Other key aspects of SRI include shareholder advocacy and community investing (UNEP, 2005). In response to the growing interest in SRI investment strategies by the world's institutional investors, Elkington (1998) conceived the principle of the 'Triple-Bottom Line' as a means of applying a more holistic, sustainable approach – including financial, social and environmental factors – to the calculation of a company's value (discussed in more detail below). However, despite the growing interest in ESG-focused investment by institutional investors, the vast majority of investors still accept the historical assumption that socially responsible investments are an inefficient way of investment and likely to reduce financial return. Friedman (1980) had provided a widely accepted academic basis for the argument that the costs of behaving in an ethically responsible manner would outweigh the benefits (Ballou, Godwin, and Shortridge, 2003). These assumptions,

however, have begun to be challenged by the mainstream investment community since the turn of the millennium.

As previously discussed, environmental and social issues have been subjects of much debate at global policy meetings during the late eighties and throughout the nineties. However, corporate governance was an issue that had not yet made it into the sustainability debate. That changed in 1998 with the creation of a list entitled the *Fortune 100 Best Companies to Work For*, which was compiled by Levering and Moskowitz. Each year, the list highlights companies in the United States who emphasize corporate social responsibility, including considerations about how the companies are managed, what the stockholder relationships are and how the employees are treated over the past year. A study by Ballou, Godwin and Shortridge (2003) investigated the relationship between the firm values of the listed companies as compared with the firm value of the non-listed companies in the same industry. They found that market capitalized values of listed firms exceeded those of non-listed firms. Finally, the researchers also found higher market capitalized values for the firms that were ranked higher on the list.

### **From Socially Responsible Investment to Responsible Property Investment**

In reaction to egregious corporate practices that came to light in the early 2000s (e.g. Enron), historically conservative pension funds became active proponents of ESG-factors in their investment decisions (UNEP-FI, 2007b). During this time there was also a shift away from the pure value-based focus of the original SRI movement, toward

‘Responsible Investment’<sup>8</sup>, which is “essentially a brand of enlightened self-interest for the 21<sup>st</sup> century” (Krosinsky and Robins, 2008: 8). The responsible property movement quickly gained supporters, and in 2005 the United Nations Secretary-General invited a group of the world's largest institutional investors, representing 20 institutional investors from 12 countries, to join in developing the *Principles for Responsible Investment (PRI)*. This group was supported by a 70-person, multi-stakeholder group of experts from the investment industry, intergovernmental and governmental organizations, civil society and academia ([www.unpri.org](http://www.unpri.org)). The *PRI* launched in April 2006 and included six principles providing a standardized global framework within which investors can consider ESG issues alongside the more traditional financial factors considered when fulfilling their fiduciary duties and responsibilities. As of April 2012, 1,126 institutional investors have become signatories, representing assets under management of approximately \$30 trillion (ibid).

During this same period of time, the results of a United Nations Environment Programme-Financial Initiative (UNEP-FI)-commissioned report further brought ESG concerns and responsible investing principles to the mainstream investment community. The report argued that it was not only permissible to include ESG concerns in financial investment considerations, but that it was arguably part of their fiduciary responsibility (Freshfields, Bruckhaus and Deringer, 2005). The idea that the investment community has a responsibility to consider sustainability issues as part of their due diligence has continued to be supported in current literature (Davis, Lukominik and Pitt-Watson, 2006;

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<sup>8</sup> For an overview of responsible investing, see Mackenzie and Sullivan (2006).



Krosinsky and Robins, 2008). Lee and Faff (2009) found that leading firms with an emphasis on integrating sustainability concerns do not underperform the market and that they exhibit significantly lower idiosyncratic risk. However, there has been some debate. Butz and Laville (2007) found that investors addressed ESG only to the extent they were financially material. Holden & Partners (2008), argue that the reason SRI funds performed as well as mainstream funds was because in most cases they were, in fact, mainstream funds. Despite the lagging belief of some investors, there has been a significant increase in socially responsible investment over the past decade. The Social Investment Forum (2011) estimated that \$3.07 trillion of “professionally managed assets [are] following SRI strategies in the United States” – a rise of more than 380% since 1995, compared to the broader universe of institutional investment that increased by only 260% during the same time period. Perhaps more importantly, investment in SRI funds increased 13% between 2007 and 2010, as compared to a 1% increase in the broader investment universe. This indicates that the investment community believes SRI funds are more resilient and can not only withstand the current, recession-riddled economy, but prosper in it. There is merit in this belief. Since 2009, 65% of the SRI mutual funds outperformed non-SRI benchmarks (Social Investment Forum, 2011).

The *Global Real Estate Sustainability Benchmark (GRESB) 2012 Report* found that the relevance of sustainability for real estate investors has reached a tipping point, and that the “activity is not being driven by a desire to create responsible investments, but rather by the positive influence that sustainability factors have on both risk and return of real estate companies and funds” (GRESB, 2012: 8). Authors of *The Report* also note

that real estate owners and investors are making explicit statements about integrating and implementing sustainability into their portfolio investment strategies. The main barrier for institutional investors is in the implementation of their strategies; this is because investors are passive and have no direct leverage over the buildings owned by the fund. As a result, survey respondents in the *GRESB 2012 Report* are placing an increased importance on the selection of property management companies and specifically choosing ones with sustainability expertise.

Another indication that integrating ESG and sustainability concerns into corporate strategic planning can have a positive impact on the overall financial performance of a company is the Dow Jones Sustainability Index (DSJI)<sup>9</sup>, which has outperformed the Dow Jones Industrial Average (DJIA) index since its inception in 1999. The DJSI provides financial quantification of each company's sustainability strategy and their management of sustainability opportunities, risks and costs with the goal of providing investors and companies "insight into the trends and events driving global supply and demand of sustainable products and services" (DJSI, 2011). The DJSI assesses five main areas of corporate sustainability: 1) integration strategy; 2) financial ability; 3) ability to foster loyalty through customer management and service and product innovation; 4) corporate governance and stakeholder engagement; and 5) human resources management.

Similarly, the Carbon Disclosure Project (CDP) recently released its *CDP Global 500 Climate Change Report 2012* on corporate behavior as it relates to climate change

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<sup>9</sup> More information about the Dow Jones Sustainability Index, as well as annual performance reports, is available at: [www.sustainability-index.com](http://www.sustainability-index.com).

issues. Despite the recent recession, 96% of respondents to the CDP questionnaire<sup>10</sup> indicated that they still have board or senior executive oversight of climate change and 78% stated that climate change considerations were integrated into their wider business strategy, up from 93% and 68%, respectively, in 2011. Of these respondents, only 54% were integrating climate change issues into their long-term strategies, while 65% indicated that climate change is influencing their near-term strategies. 82% of companies on the Global 500 had set absolute targets or intensity emissions targets, but only 20% of them had set targets beyond 2020. In addition, 68% of respondents noted additional benefits beyond financial benefits, such as enhanced reputation and customer behavior changes. Despite this acknowledgement, 49% of the companies stated that government regulation was an important driver in their decision to pursue emissions mitigation. Other important drivers identified in the report include: physical changes, stakeholder pressure, and customer behavior. Although the report is not specific to real estate decision-making, it is important to consider in the context of sustainable real estate because it offers insight into the mindset of corporate tenants, who in turn are influential in driving the demand side of the real estate market.

The *CDP Global 500 Climate Change Report 2012* noted that leading companies were thinking long-term about climate change issues, with 94% of the companies listed on the Carbon Performance Leadership Index (CPLI) acknowledging that climate change has had a significant impact on their long-term strategic planning, as compared with only

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<sup>10</sup> CDP sent its questionnaire to all of the Global 500 companies. The Global 500 are the largest companies by market capitalization included in the FTSE Global Equity Index Series. 81% (405) of them responded to the questionnaire. The *CDP 2012 Report* is based on 379 responses received by July 1, 2012.

54% of all the companies in the Global 500. Supporting the business case for integrating sustainability initiatives into long-term strategic planning, it is interesting to note that the *CDP 2012 Report* found that companies on the CPLI or the Carbon Disclosure Leadership Index (CDLI) have generated superior stock performance. While Global 500 companies generated an overall annual return of 6.4% since 2010, CPLI companies generated an average annual return of 15.9%. During that same period (2010-2012) the Global 500 companies had a total return of 31.1%, nearly half of the 67.4% return generated by CDLI companies (CDP, 2012).

Responsible Property Investment (RPI) acknowledges the aforementioned benefits of implementing responsible, sustainable investing strategies and applies the *Principles for Responsible Investment* more specifically to real estate investment decision-making. Galley, Rogers and Wood (2009) note that the sustainable real estate asset class “offers especially tangible demonstrations of the importance of ESG analysis in creating value for investors and society alike. Proponents of RPI identify increased regulatory risk, resource constraints, changing consumer preferences and demographics among the drivers changing the real estate investment industry. A significant barrier to ESG analysis becoming an industry ‘best practice’ is the current lack of an industry-standard set of metrics to evaluate ESG performance across portfolios, to enhance acquisition and disposition decisions, and for performance reporting (ibid). Performance and assessment standardization is discussed in more detail in the ‘Assessing Sustainable Real Estate’ section below.

## **Connecting Corporate Social Responsibility with Sustainable Real Estate Decisions**

In this context of Responsible Property Investment, it is important to note the positive impacts associated with corporate social responsibility and sustainability in real estate investment decisions. Haigh and Jones (2006) provide a detailed discussion of the drivers prompting firms to support CSR and the implications of that support for potential policy options. The issues of social responsibility and “eco-efficiency are confounded with straightforward capital budgeting decisions involving choices between the levels and types of initial investment and consequent operating inputs chosen to maximize investor returns” (Eichholtz, Kok and Quigley, 2010a: 2493). Benefits from investment in sustainable buildings may be obtained in several ways: 1) direct and tangential financial benefits from energy savings at the time of construction; 2) higher employee productivity resulting from improved indoor air quality; 3) improved corporate image of tenants occupying space in ‘green’ rated buildings; 4) buildings may have longer economic lives as a result of tenant preferences – and as a result the buildings would incur lower risk premiums and higher valuations (ibid).

Acknowledging these benefits, major corporations and retailers are including sustainability goals related to their real estate decisions in their ‘corporate social responsibility’ (CSR) statements (Waddock and Graves, 1997). The increased requirements for these space users to look for sustainable space are quickly becoming the primary demand drivers for sustainable real estate (Pivo and McNamara, 2005; Pivo, 2007 and 2008; Rapson, Shiers, Roberts and Keeping, 2007).

## The Sustainable Real Estate Decision-Making – The Literature is Limited

As the concepts of sustainability and sustainable development have continued to evolve at the global level through UN and organizational efforts, they have also become an increasingly central concept in real estate decision-making over the last 15 years. Despite the multitude of sustainable development definitions, the three pillars of sustainable development – economic, environmental, and social concerns – are generally agreed upon by scholars and practitioners (Banuri and Weyant, 2001) and represent the three dimensions of sustainability that should be considered in sustainable real estate decision-making. While the three

pillars were initially treated and measured as independent facets with ‘sustainability’ as a measure of their sum value, sustainable development has gradually developed into an integrating, holistic concept (Lele, 1991)

considering both synergies and trade-offs between the three pillars

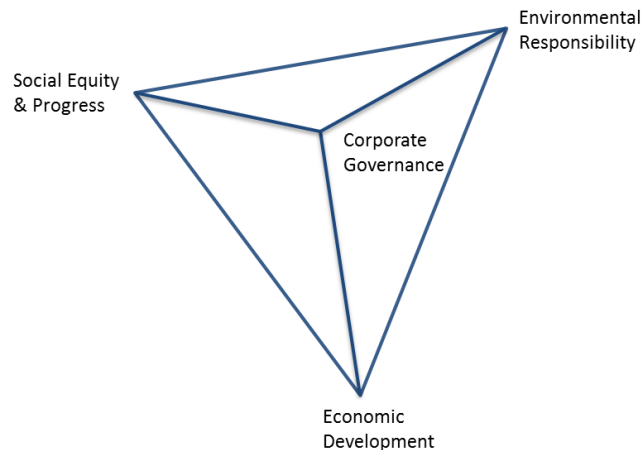


Exhibit 2.5: The Four Interconnected Dimensions of Sustainable Decision-Making and Assessment: Economic, Environmental, Social and Governance.

(Banuri and Weyant, 2001). More recently, the concept of *Principles of Responsible Investment* (UNEP-FI, 2006) put forth that the RPI decision-making process should include consideration of financial, environmental, social *and* governance (ESG) criteria, thus adding a fourth dimension of consideration to sustainability decision-making. In this

research, the four dimensions are viewed not as four pillars, but rather as four interconnected points of a pyramid (see Exhibit 2.5).

The most relevant and applicable recent qualitative study for this dissertation research is the Delphi study by Pivo (2008) as he focused specifically on the criteria for responsible property investment. Pivo does an excellent job of building the case for using the Delphi Method in real estate research. The Delphi panel (unspecified number of participants), was asked to rate 54 criteria on a Likert scale, and over the course of three rounds of review the panel moved from weak agreement to moderate/strong agreement with fair to high confidence in each of the ratings. Next, the author compared the 54 criteria and dimensions to the criteria in the LEED New Construction (NC), Existing Buildings: Operation & Management (EBOM) and Neighborhood Design (ND). Of the 54 criteria included in the Pivo study, 45% of them were represented either directly or indirectly by at least one of the LEED rating tools. A limitation to the study is that governance issues are not considered despite being important factors in responsible investing (UNEP-FI, 2006). Another limitation of the study is its lack of consideration for cost implications, although the author does note this as an avenue of further research. Lastly, the study captures only a brief span of time in 2006. It is unclear whether the sentiments of the panelists would remain the same during and after the current recession. The dissertation research incorporated the findings of Pivo's study as part of the initial list of criteria and indicators (Exhibit B-1 in Appendix B) which were then discussed in the interviews with the expert panel.

Another study of particular interest for this dissertation is Eichholtz, Kok and Quigley (2010b), who used information from the CoStar Tenant Module to investigate the motivations influencing firms' decisions about green corporate housing decisions. Specifically, the research looked to validate the Bansal and Roth (2000) theoretical framework explaining the ecological stance of firms. The study used a sample of 3,179 tenants (in a variety of industries) leasing space in 1,180 'green'-certified office buildings in the US and a control sample of roughly 8,000 tenants in 4,390 office buildings. To control for location effects, the control properties selected were within 0.25 mile of a subject properties. Results included both descriptive statistics and those developed from a regression analysis. Ultimately the authors were able to support their hypotheses and build upon the early work by Bansal and Roth, that motivations of competitiveness, legitimization and environmental responsibility, as well as a mixture of these motivations, influence decisions to lease 'green' space. A self-identified limitation of the study is that the study was only able to test firm motivations at the industry scale due to the limitations of the dataset; they suggest further, more in-depth research in this area. This dissertation seeks to build upon this research and also queries the expert panel about their motivations for considering sustainability concerns to determine if competitiveness, legitimization, and environmental responsibility are still influential in the strategic decision-making process.

Taking a more theoretical approach, McCarty, Jordan and Probst (2011) apply a Six Sigma leadership approach of 'define, measure, analyze, improve, and control' (DMAIC) to environmental decision-making. They emphasize that *Six Sigma for*



*Sustainability: How Organizations Design and Deploy Winning Environmental Programs*

is a business book, rather than a technical guide, and the discussion therefore focuses on the corporate strategic decision-making strategies related to services companies and office buildings. The authors identify a few key decision-making concepts related to sustainable real estate that were influential to the current dissertation research, these include: 1) the need for dashboards delivering real-time performance data that enable timely, fact-based decision-making; 2) a proposed structure to create a transfer-function as a decision management tool; 3) the power of collaborative teams and importance of effective change management strategies; 4) failure to report on sustainability can increase reputational risk; and 5) how companies and firms have shifted their goals for stakeholder engagement away from social good to performance strengths and weaknesses.

Leading industry professionals and organizations have committed to including sustainability factors in real estate decisions and have become increasingly vocal about their belief in the economic viability of doing so. However, there is still considerable debate about which specific criteria and indicators should be considered, as well as which metrics and measures need to be applied in assessment of sustainable real estate to track attainment of sustainability goals/targets/statements. For “ESG analysis to become [real estate] industry best practice, some system of measurement will need to establish rigorous standards that hold investors accountable for their claims and offer investors the capacity to favor higher performing buildings and portfolios in practice” (Galley, Rogers and Wood, 2009: 5). However, McCarty, Jordan and Probst (2011) suggest that relying on good metrics and process-management methods are insufficient tools to attain desired

improvements unless they are integrated into a set of leadership and government practices supported by a collaborative management model and the disciplined practice of specific leadership behaviors. Ultimately, the “pursuit of sustainability therefore involves fostering fundamental transitions in our authoritative institutions as well as transitions in the particular practices that are driving undesirable trends...by requiring and guiding adoption of a way of thinking, planning, evaluating, choosing and acting that is fundamentally different than traditional approaches” (Bond, Morrison-Saunders and Howitt, 2013: 9). It is the goal of this dissertation research to uncover current ESG and sustainability analysis best practices for each of the stakeholder groups in the real estate process to aid in the transition through the dissemination of these best practices to the larger real estate industry.

## **SUSTAINABLE REAL ESTATE ASSESSMENT**

Early sustainability assessment systems evolved from work related to environmental impact assessment (EIA). As a result of frustrations experienced about the perceived limitations of project-based EIA, many practitioners turned to strategic environmental assessment (SEA) as a means of sustainability assessment (Devuyst, 2000; Pope, Annandale and Morrison-Saunders, 2004). As a result of their ‘roots’ in environmental assessment, these early sustainability assessment systems were often heavily weighted on the management of environmental indicators, and the performance assessment often applied the triple bottom line model in an attempt to quantify environmental impacts through monetary impact. This evolutionary process explains

why early sustainability assessment tools were considered to be the ‘next generation’ of environmental assessment (Sadler, 1999).

The real estate and construction industries have been criticized for being slow to adapt to the increased focus on sustainability within the broader business context (Sayce, Ellison and Parnell, 2007). However, things are beginning to change. New buildings in the United States - as well as Europe, Australia, and Canada - are being built with a range of environmental features and accreditation of both new construction and existing buildings (e.g. LEED, BREEAM and GreenStar rating systems) are on the rise. As of August 31, 2011, the Green Building Certification Institute (GBCI) has certified 10,000 new and existing commercial projects in the US, and over 100,000 projects have been LEED certified globally. “Created in 2000, the LEED green building program has become a global symbol of sustainable building certifying more than 1.4 million square feet of new and existing buildings every day” (USGBC press release, 2011).

### **A Struggle toward Standardization**

While the construction and development side of the real estate industry (the supply side) has made progress in developing environmental benchmarking tools (e.g. LEED and EnergyStar), the demand side of real estate has struggled with developing successful sustainability measures. Benchmarking tools targeting property owners and occupiers have been developed by several organizations and many countries around the world. An internet search identified over 150 different building assessment rating tools (see Appendix A for a partial list of building assessment rating systems). In a more in-

depth search, the Engineering and Physical Sciences Research Council (EPSRC) found 700 different tools that measured or evaluated at least one aspect of sustainability – the social, environmental and/or economic pillars; however, they note that none of these systems is capable of measuring all aspects of sustainability at one time. Perhaps for this reason, no system has emerged as *the* global standard for sustainable real estate development.

The plethora of tools has caused a lack of consistency among the tools with regard to assessment criteria and measures, which has in turn resulted in a lack of consistency in the collection and reporting of data. As a result of this inconsistency, there is an inability to compare and monitor sustainability performance in the real estate industry and within real estate portfolios (Levy and De Francisco, 2008; IPF, 2009; Lowe and Ponce, 2009; Ellison and Brown, 2010; RREEF, 2010). For industry executives hoping to make positive contributions to the community and the environment, this complexity can be daunting. Allan Skodowski, senior vice president of Transwestern's sustainability services group, notes: "...the entire mood in the building industry is more about doing the right thing...The difficulty is understanding what the right thing is" (Malin, 2010).

A study by GVA Grimley (2008) emphasized that investors aren't the only real estate stakeholders putting an increased emphasis on sustainability in their decision-making, occupiers are also getting on the sustainability bandwagon (GVA Grimley, 2007, Jones Lang LaSalle, 2008) - in particular with regards to energy savings (Wiley, Benefield and Johnson, 2008; Eichholtz, Kok and Quigley, 2009). However, although occupiers are beginning to include ESG issues in their CSR statements and corporate

space leasing decisions, standardization efforts have not yet trickled into the sustainability debate - in part because of the lack of standardization in the way the supply side of the industry is communicating sustainability performance:

For the demand side of the property industry to make effective progress in understanding, measuring and improving sustainability of commercial real estate, a common set of metrics through which sustainability performance can be measured is required (Ellison and Brown, 2010: 3).

The growing body of research indicates that “an information demand exists which cannot be appropriately satisfied at the moment” (Lowe and Ponce, 2010: 20). The problem is twofold: 1) information on the sustainability performance of buildings is not readily available and 2) key actors in property and construction markets are not organized enough to facilitate the necessary information flow (ibid).

Muldavin (2010) agrees that there is a demand for this information and notes that there are several clear business drivers for collecting sustainability data at the individual asset level. However, despite the growing empirical data supporting the positive impact of developing sustainable real estate, sustainability has not yet emerged categorically as a factor in the determining the market value of a real estate asset (Sayce, Sunderberg and Clements, 2010). One reason for this is that the real estate valuation community has not yet figured out how to incorporate sustainability attributes into their valuations. Therefore, some owners and facility management professionals have less of an incentive to participate in the daunting task of data collection than members of the investment community who are currently starting to demand this type of information for their prospective acquisitions.

Unfortunately, rather than encouraging standardization efforts, the frustration over the lack of standard benchmarking measures and metrics has prompted individual companies and investment funds to develop their own sustainability measures/matrices. Ellison and Brown (2010) indicate there are two potential negative impacts of this “go it alone” strategy which is exacerbating the variation in sustainability assessment systems. First, the opportunity to compare and judge the sustainability performance of properties, portfolios, and organizations is limited and this in turn limits a key driver of industry change – competition. Second, the lack of consistency makes it difficult for an organization interested in becoming more sustainable to decide on the best approach to adopt when beginning the data collection process for the purpose of monitoring progress in achieving their sustainability benchmarks.

One attempt to overcome the disparity among the existing benchmarking criteria in the real estate investment community is a research project currently underway by the Investment Property Forum (IPF) in London, UK. To date the research has focused on developing a methodology that will be used to create a framework for a Sustainable Property Index (ISPI). The framework is the first phase of the long-term goal of producing a sustainability index.

The overall aim of this research was to develop a system for tracking the investment performance of commercial building against sustainability. As the property industry has begun to work towards improving the sustainability performance of commercial buildings, it has become apparent that specific tools are needed to support this process and are simply not available yet...It was anticipated at the outset of the project that there should be no correlation between investment performance and sustainability at this stage (IPF, 2009:1)

The researchers developed a coding framework (themes) that was refined based on industry feedback (via a survey of fund managers) and tested with a pilot group. The coding framework allows for commercial buildings to obtain either an ‘achieve’ or ‘not achieve’ sustainability classification. The classification system was designed to allow for the assessment to be completed using data that is generally known to exist in the public domain, either as data generally collected internally and reported by building owners or as data that is available from third party sources. The framework is “designed specifically for the property investment community as a means of linking sustainability and investment performance, it is not designed as a detailed sustainability assessment tool for commercial buildings” (IPF, 2009: 8). Throughout the IPF report, the authors acknowledge that as the level of sustainability knowledge continues to grow in the commercial real estate industry, the questions and framework will need to be continually fine-tuned. The framework, however, is a good first attempt to engage the industry in the conversation of sustainable real estate development, and through the dialogue move the industry towards more uniform measures that enable improved comparison of sustainable assets. The process used in the IPF research to create a framework for analyzing these issues was influential in shaping the process adopted in this research. Sustainability criteria and indicators identified by the study as influential in linking sustainability and investment performance were included in the initial list of criteria and indicators (see Exhibit B-1 in Appendix B) discussed with the Delphi panelists in the first round of interviews.

More recently, there have been several other significant efforts to standardize performance data and reporting systems<sup>11</sup> within the business community, and more recently, specifically within the real estate community. These include the United Nations *Principles for Responsible Investment (PRI)*, the Greenprint Foundation's *Greenprint Performance Report*, the Climate Disclosure Standards Board's (CDSB)<sup>12</sup> *Climate Change Reporting Framework*; the Global Reporting Initiative's (GRI) *G3.1: Sustainability Reporting Guidelines* and the GRI's *Construction and Real Estate Sector Supplement (CRESS)*; and the *Global Real Estate Sustainability Benchmark*.

The Climate Disclosure Project's *Climate Change Reporting Framework* includes two categories for disclosure: 1) overall strategic analysis (short and long term) and 2) reporting on risk and governance of climate change and greenhouse gas emissions. Several industry-specific and national guidelines are incorporated into the *Framework*, among the most influential are the *GHG Protocol* and the *ISO 14064-1* specification. The *GHG Protocol* (2001) was developed by the World Council for Business and Sustainable Development in response to developing global climate change policy to understand and manage greenhouse gas (GHG) emissions. The *GHG Protocol* is the most widely applied international accounting tool used to quantify GHG emissions ([www.ghgprotocol.org](http://www.ghgprotocol.org)). The *ISO 14064-1* (2007) is part of the larger International

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<sup>11</sup> McCarty, Jordan and Probst (2011) offer an in-depth discussion of global reporting protocols, including: the GHG Protocol, the Global Reporting Initiative, the Climate Registry, the Carbon Disclosure Project and the International Standards Organization. In addition, the authors provide a list of voluntary reporting initiatives and sustainability investment- and building-rating agencies.

<sup>12</sup> The Climate Disclosure Standards Board's (CDSB) is a consortium of eight businesses and international reporting framework companies, including the Carbon Disclosure Project (CDP), Ceres, the Climate Group, the World Council for Business and Sustainable Development (WCBSD), the Climate Registry, the International Emissions Trading Association (IET), the World Economic Forum (WEF), and the World Resources Institute (WRI) ([www.cdsb.net/about/](http://www.cdsb.net/about/)).



Standards Organization (ISO) 14000-series of Environmental Management Systems<sup>13</sup>. It specifies principles and requirements for quantification and reporting of GHG emissions and removals at the facility/organization level ([www.iso14000-iso14001-environmental-management.com/](http://www.iso14000-iso14001-environmental-management.com/)). The CDP's *Framework* is among the leading environmental reporting frameworks. From a broader sustainability perspective, its weakness is that it includes only minimal acknowledgement of the social and economic impacts of these activities.

Like the Carbon Disclosure Project, the Greenprint Foundation focuses on the environmental impact of business activities, specifically, the carbon footprint of the property industry. The Greenprint Foundation, now the ULI Greenprint Center for Building Performance, is a growing global alliance of real estate owners, investors, financial institutions and practitioners dedicated to reducing the carbon footprint of the built environment. They have committed to testing and evaluating carbon emissions alternatives for all property types and to “leading the global real estate community toward value-enhancing carbon reduction strategies that support the IPCC goals for global greenhouse gas stabilization by 2030” (Greenprint Foundation, 2012). By providing information about successful sustainability programs and case studies, white papers and research demonstrating the direct link between property values and energy efficiency, the Greenprint Foundation aims to become a catalyst for change in the built environment. The *Greenprint Performance Report, Volume 2* (2010) measures member's relative GHG emissions reduction progress by providing current carbon footprints of individual

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<sup>13</sup> ISO 14001 is a good standard for company performance at the facility level, but it doesn't speak to activities at the corporate level or any aspect of sustainability beyond environmental.

buildings and compares them with previous emissions. The organization analyzed 1,623 properties (an increase of 170% from the 2009 report) and 31 million square feet of commercial space (an increase of 93% from the 2009 report). Individual buildings or group of buildings are analyzed, and then reported in the aggregate by asset type: office, industrial, retail, multifamily and hotels. This enables members to compare their individual progress with the industry at large. As Greenprint continues to gather data, the ultimate goal is the development of a true performance index (Greenprint Foundation, 2010). The Greenprint Foundation's efforts to standardize key performance indicators (KPIs), in particular their participation in the development of a common carbon metric, was influential in informing the communication with Delphi panelists throughout the dissertation process. Many of the participants on the Delphi panel participate in the Greenprint Foundation's reporting and benchmarking efforts, and all of them identified carbon footprint (and by extension the common carbon metric) as a KPI that should be measured and tracked as part of the strategic decision-making and planning process.

The Global Reporting Initiative's (GRI)<sup>14</sup> *G3.1: Sustainability Reporting Guidelines* is currently the most utilized global standard for reporting of corporate social responsibility and sustainability (Pivo, 2008; GRI, 2011a). Like the *Greenprint Performance Report*, the *GRI Construction and Real Estate Sector Supplement* specifically targets the built environment stakeholders. Launched in September 2011, it provides guidelines for measuring, monitoring and reporting of sustainable business

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<sup>14</sup> The Global Reporting Initiative (GRI) promotes sustainability reporting by providing companies and organizations with a comprehensive sustainability performance reporting framework. The global network of the GRI includes over 30,000 people and the *G3.1* is one of the most used sustainability reporting frameworks globally ([www.globalreporting.org](http://www.globalreporting.org)).

strategies, performance, and impacts at all stages of the built environment lifecycle. Some of the issues covered in *CRESS* include: management and remediation of contaminated lands, building and materials certification, carbon emissions and sub-contracted labor health, and safety issues. *CRESS* is intended to help real estate investors, managers, and developers “be more transparent about the impacts their activities and assets have on the environment, economy and society...making sure that companies in the construction and real estate sector have the tools to communicate their impacts is vital if we are to move to a sustainable economy” (Goodchild, 2011: press release).

The *Global Real Estate Sustainability Benchmark (GRESB)* (2012) is an annual science-based evaluation of environmental and social performance in the real estate industry. A survey of real estate companies and investment funds scores individual metrics to create scorecards for respondents as well as a report for the industry. The *GRESB 2012 Report* includes responses from more than 35 institutional investors and 450 property companies and funds, worldwide, providing information about 36,000 properties representing approximately \$1.32 trillion in global assets under management. As detailed in Exhibit 2.6, recipient scorecards provide information regarding sustainability performance of real estate investments and weighted portfolio performance. The *GRESB* scorecard identifies areas of investment risk and areas for improvement. The analysis also compares a respondent’s score with the regional average and the regional leader in each category. The *GRESB* scoring methodology rewards sustainability actions

and attempts to block potential green washing efforts by weighting implementation and measurement more heavily than management and policy.

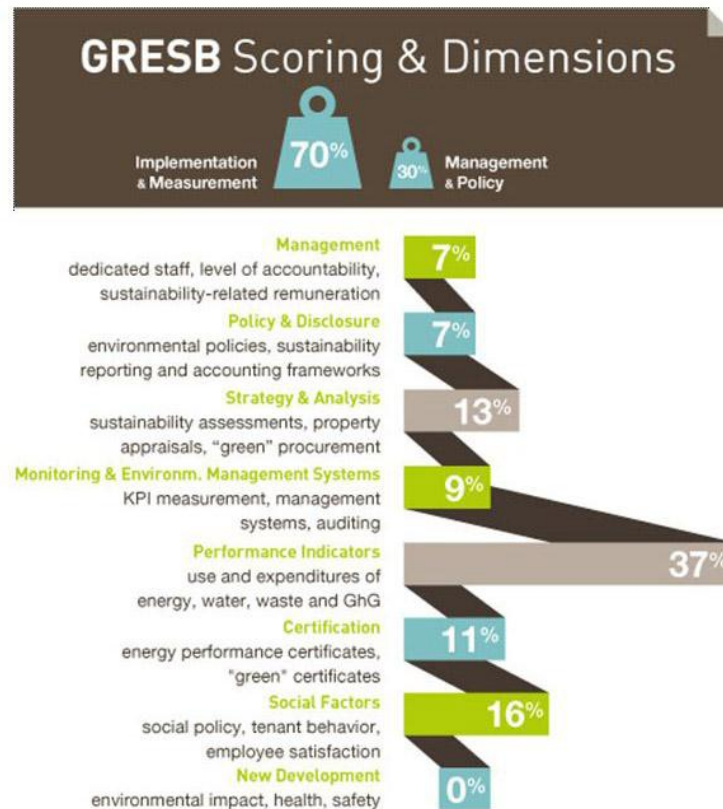


Exhibit 2.6: *GRESB 2012 Report: Scoring and Dimensions*. The seven sub-categories and metrics used to score the environmental and social dimensions in the GRESB report (2012).

Key trends observed in the *GRESB 2012 Report* include an increase of respondents collecting data and reporting on energy consumption (60% as compared to 34% in 2011); although there was an increase in overall energy consumption, the data indicates there has been a reduction of GHG emissions of approximately 6% on a like-for-like basis (i.e. normalizing the results from 2011 to 2012). In addition, green building

certifications are becoming increasingly important (with LEED most widely accepted) with 51% including them in their portfolio.

### **Triple Bottom Line Model vs. Principles-Based Model**

Reijnders and van Roekel (1999) separated assessment tools into two broad classifications: qualitative tools based on scores and criteria and quantitative tools using a physical life cycle approach. Both are represented among the variety of assessment tools around the globe. Qualitative tools are often based on auditing of buildings and assigning scores to each investigated parameter. The scores are then combined to create an overall score for the building. Some of these parameters may be measured quantitatively, e.g. energy usage, while others are entirely criteria based. In contrast, the quantitative group of assessment tools that emerged in the late 1990s used quantitative data from life cycle inventories (LCI) or production data of material or energy flows. Most of the developments seen in the assessment tools listed in Exhibit A-1 (Appendix A) fall in the category of the qualitative assessment tools as described by Reijnders and van Roekel (1999) and are in a continuous evolution from the traditional triple bottom line assessment approach to a more principles-based approach, as set forth by Gibson:

We have therefore chosen here to propose a slightly different approach - one that avoids constructing the edifice of sustainability criteria on the conventional pillars...The alternative, which is perhaps only superficially different from the pillar approach, is to begin not with categories based on the usual areas of concern (ecological, social, etc.) but with a list of the key changes needed in human arrangements and activities if we are to move towards long term viability and well-being (2001: 8).

In business, the three-pillars of sustainability are most commonly incorporated into decision making through the triple bottom line model (Kats, 2003) which separates development issues into social, environmental, and economic factors, emphasizing that “material gains are not sufficient measures or preservers of human well-being” (Gibson, 2001: 7). Gibson points out that the three pillars of the triple bottom line method, despite being acknowledged as interconnected and interdependent, still: “reflect more or less conventional modern disciplinary categories” whereas sustainability should be, “an attack on conventional thinking and practice” (Gibson, 2001: 6). Bartelmus (2013) makes a strong argument that traditional cost-benefit analysis, while helpful for governments in selecting environmental programs, cannot assess the economic sustainability performance. Similarly, he suggests that optimal growth models, although useful in conceptualizing sustainable growth, are less useful for policy development. Instead, he concludes that integrated environmental-economic accountability is the only analysis method by which the operational measures of the sustainability of both economy and environment can be acquired.

Gibson (2001) offers an alternative solution to the triple bottom line method and suggests using a principles-based approach to sustainability assessment. In this approach, sustainability criteria are based upon sustainability principles rather than triple bottom line goals, and the interconnections and interdependencies between the ‘pillar’ areas are emphasized. Gibson argues that as a result, a principles-based approach may circumvent some of the intrinsic limitations of the triple bottom line approach to sustainability (e.g. the need to monetize environmental attributes whose primary contributions are social,

like a park, or environmental, like preserving watersheds). Similarly, George (2001) recognizes the limitations of the triple bottom line approach (as applied in the UK) and concludes that a principles-based approach is more appropriate for developing sustainability criteria. Both Sadler (1999) and George (2001) recommend an approach based upon fundamental principles of sustainability as defined by *Agenda 21*. Gutierrez-Espeleta further clarifies that while different approaches can be taken in the development of sustainable development indicators and criteria, “they must be able to meet the challenge of fully integrating the social, economic, environmental, and institutional aspects of development, in accordance with the main conclusions of the UNCSO in 1997” (2007: 353). It is important to note that Gutierrez-Espeleta here includes the fourth ‘pillar’ of sustainability as outlined in the *Principles of Responsible Investment* - institutional governance.

As the more established building assessment systems (e.g. LEED and BREEAM) have evolved, they have continued to move away from their EIA and SEA roots based in environmentalism toward a more holistic approach considering all the facets of sustainability. As the assessment systems continue to evolve, they are moving beyond the triple-bottom line approach and they have begun to structure their assessment frameworks on key sustainability principles. This has also allowed these rating systems to integrate broader measurements associated with corporate social responsibility in to their assessment criteria.

## **Building Assessment Rating Systems**

Applying the idea of principles-based assessment in an evaluation of current assessment rating tools, Lowe and Ponce (2009) outline a set of principles that are included in at least five of the six most commonly applied building assessment rating systems (BREEAM, LEED, CASBEE, HQE, GreenStar and Protocollo ITACA). Each of these rating systems has come out with new editions since this study was completed and as a result the details of the report are less relevant today. However, of interest to the dissertation research is their indication that building assessment rating systems are principally concerned with issues related to the environment, and that economic and social issues are under-represented (although some issues do address a combined environmental/social concern, e.g. lighting and visual comfort). In addition to reducing a building's environmental footprint, the most recent versions of these assessment rating systems are also working with their communities to ensure that buildings also have positive social and economic impacts. These are issues that must be continually considered as the assessment rating tools continue to evolve so that they can be more in line with the corporate social responsibility (CSR) requirements of the investment and occupier stakeholder groups. This issue was included as a topic of discussion in the Delphi interviews with industry experts in the dissertation.

Why does standardization in assessment toward more comparability of credits and measures, and integrated, holistic assessments systems for both new *and* existing building matter? As Storm Cunningham points out in *The Restoration Economy*, new development began rapidly losing 'market share' to restorative development in the



1990's. "Economic growth based primarily on the exploitation of new resources and new territories is giving way to economic growth based on expanding our resources and improving existing assets" (2002, viii). Since the United States recession began in 2007, USGBC reports that there have been more LEED-EBOM applications than LEED-NC.

This is an important shift; it has changed the character of businesses, communities, and countries, particularly as we begin to address GHG emission reductions at the global scale. Cunningham distinguishes between 'sustainable development' and 'restorative development', which he says is about "revitalizing the domain we already occupy [as opposed to] expanding our domain in a sustainable manner" (ibid: viii). Lowe and Ponce (2009) also acknowledged this shift to a more holistic, integrated, and regenerative system.

Much of the research in the LEED/BREEAM assessment literature is related to the LEED-New Construction (LEED-NC) and BREEAM Office and indicates that the 'war over new buildings' has essentially been won in that most new buildings are significantly more energy efficient than existing building stock. As noted earlier, new construction adds only 1-2% to the total building stock per annum, and most recently during the recession new construction has had even less of an impact on the total building stock. During this time, there had been a significant increase in building adaption and re-use as seen by the increased number of LEED-Existing Buildings Operation & Management (EBOM) applications. In the US, the most recent version of the LEED-rating systems (2012) is making moves to consider long-term impacts on the global environment and rewarding those who make positive, regenerative design decisions.

Similarly, the new BREEAM In-Use (2009) has added flexibility and rewards developers who recognize and maximize opportunities for existing building improvement. This change in BREEAM indicates that the UK real estate industry is also making moves related to retrofitting existing buildings. Australia has also seen a move toward encouraging the adaptation of green building techniques in to existing buildings as a result of new energy and building-related policies (Wilkinson, 2011). With this recent global trend focusing on the adaption/re-use/restoration of existing buildings with sustainability features, it is hoped that sustainable real estate can have significant, positive, global impacts that will help the world meet greenhouse gas reduction goals.

## **CONCLUSIONS**

The literature reveals that both practitioners and academics overwhelmingly indicate a need for creating more unified sustainability assessment criteria and measures, but that, to date, the disparate and eclectic nature of the various criteria and measures used means that there is no ONE measurement. Most of the progress has been made toward standardizing the environmental and social attributes of sustainable real estate, however, as Lowe and Ponce (2010) note, “the questions relating to the development and application of indicators for describing and assessing economic aspects of sustainable buildings still are the subject of scientific discussion and also of standardization activities in the area of sustainable buildings at the international (e.g. ISO TC 59 SC 14 and SC17) and European (e.g. CEN TC 350) [level]” (Lowe and Ponce, 2010: 26). To date, the bulk of the research for the real estate industry is focused on understanding how sustainability

issues impact property value, not on establishing a common set of performance and assessment criteria for use in the strategic decision-making process.

The current plethora of building assessment rating systems is acting as inertia on the process of achieving significant progress towards sustainability in the real estate industry. Decision makers want simple, understandable and consistent benchmarks and measures; they also want benchmarks and measures that are the same for their competitors. This would help evaluate and compare real estate assets with others in direct competition within the market. In turn, this would promote competition in the sustainable real estate market. However, this is not a reality yet. Standardization and comparability are necessary to help continue the evolutionary process for the stakeholders in the real estate marketplace toward making decisions focused on sustainable commercial real estate. This in turn will lead to sustainability issues coming to the forefront for existing buildings, which have the largest potential to have positive impacts on our global society.

The central tenet of this research is to query the stakeholders involved in the investment, management, and development of commercial real estate property about the sustainability criteria that are currently being used to assess the sustainability performance of a given piece of property; to identify the measures and metrics of measurement for assessment of the criteria and to examine the influence of sustainability in the commercial real estate decision-making process for each of the stakeholders. Although the initial goal of the research was to develop a complete list of criteria, measures, and metrics related to sustainability performance in real estate (attempting to

be forward-thinking and include criteria/measures/metrics that are on the cutting edge of the sustainable development dialogue), the focus shifted toward how sustainability is integrated into the overall real estate decision-making strategy as the research progressed.

Exhibit 2.7 conceptually illustrates a model of decision-making factors in sustainable real estate. This model provided the framework for the dissertation research and highlights the factors which were investigated through in-depth interviews and follow-up surveys with real estate industry experts acknowledged as leaders in integrating sustainability concerns into the real estate decision-making process.

Immanuel Kant said that “it is often necessary to take a decision on the basis of knowledge sufficient for action, but insufficient to satisfy the intellect” (1988: 1396)<sup>15</sup>. This research aims to identify the criteria essential to the decision-making process, and to shed light on *how* leading sustainability strategists within the various real estate stakeholder groups are making decisions related to sustainable development - to identify both the commonalities and differences in the strategic decision-making process. Understanding the differences will, hopefully, help the various stakeholders understand how their industry collaborators are making sustainability-related decisions so that they can make more calculated decisions themselves – thereby providing not only knowledge necessary to make decisions, but also satisfying the intellect as to why.

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<sup>15</sup> Kant, I. 1988. In Halliday, S.P. 1997. Architecture of habitat: design for life. *Philosophical Transactions of the Royal Society*, 355: 1389-1403.

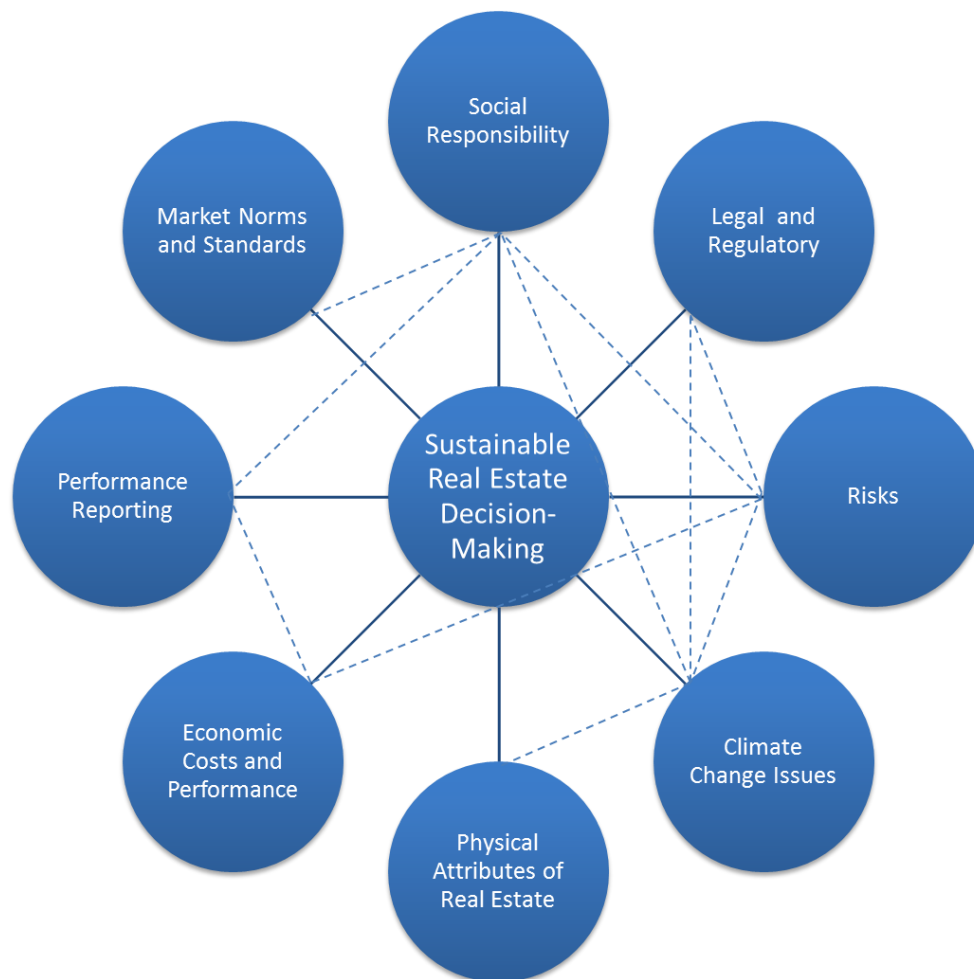


Exhibit 2.7: Conceptual Model of Factors Influential in Sustainable Real Estate. Solid lines indicate direct relationships and dashed lines indicate major relationships among the influencing factors.

## CHAPTER THREE

### CONCEPTUAL FRAMEWORK FOR RESEARCH

#### **INTRODUCTION**

This chapter presents the conceptual framework for this research. It details the pragmatic approach, the phenomenographic methodology and the mixed methods used. The overarching paradigm for this research inquiry is based in Pragmatism. Morgan (2007) advocated the pragmatic approach as a basis for supporting work that applied a mixed methods approach. Brewer and Hunter further noted that “the pragmatism of employing multiple research methods to study the same general problem by posing different specific questions has pragmatic implications for social theory” (1989: 74). This is further supported by Howe (1998), who contends that a central tenet of pragmatism is that qualitative and quantitative methods are compatible supporting the use of a mixed methods approach in this research.

#### **UNDERSTANDING THE PRAGMATIC APPROACH**

Traditionally, in the dominant system for discussing social science research methodology issues, research methodology is selected as a result of a researcher’s ontological and epistemological assumptions about the nature of reality and knowledge, respectively, as part of what Morgan (2007) terms the ‘metaphysical paradigm’. Although the metaphysical paradigm ostensibly gives equal weight to ontology, epistemology, and methodology, Morgan argues that “its top-down orientation inevitably led to an emphasis on metaphysical questions...because these ‘higher order’ assumptions

imposed limits on every aspect of their system” (2007: 58). In order to address frustrations with the top-down approach of the metaphysical paradigm, he submits that a paradigm shift is necessary in social science research. He proposes the ‘pragmatic approach’ as an alternative paradigm, and suggests that researchers (through the application of the pragmatic approach) redirect attention to methodological, rather than metaphysical, concerns. Morgan advocates that the pragmatic approach places methodology concerns as the principal ‘line of action’, with equal attention devoted to “the connection between methodology and epistemology and the connection between methodology and methods” (2007: 68) (see Exhibit 3.1). As such, methodology becomes the vehicle that connects epistemology with research design issues thereby linking considerations about the nature of knowledge to our efforts to produce it.

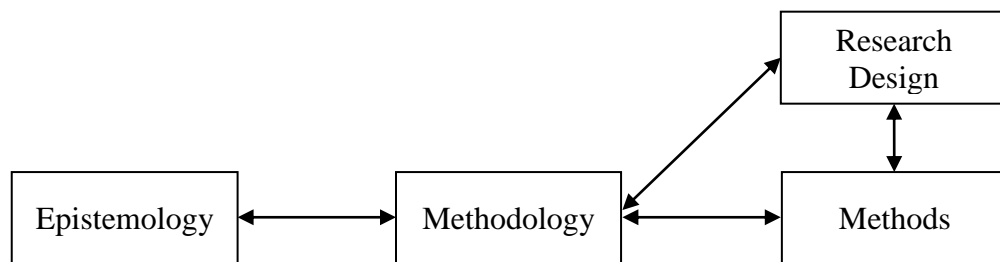


Exhibit 3.1: Conceptual Illustration of the Pragmatic Approach.

As a philosophical system, there are many variations of ‘pragmatism’ (De Waal, 2005; Creswell, 2003; Rescher, 2000). For many of them, knowledge claims arise out of actions, situations, and consequences rather than the antecedent conditions which are the basis of the post-positivist paradigm (Creswell, 2003). Pragmatists research the “what”

and “how” of these actions, situations or intended consequences. Research becomes problem-focused, rather than methods-focused, leaving researchers open to use all approaches to understand the problem. In practical terms, this means that pragmatism is real-world, practice oriented and acknowledges pluralistic viewpoints. As applied in this research, pragmatism includes the ideas of ‘warranted assertions’ (from John Dewey), ‘workability’ (from John Dewey and William James) and ‘lines of action’ (from William James and George Herbert)<sup>16</sup>.

Exhibit 3.2 (Morgan, 2007) offers an organizing framework through which the pragmatic approach can be understood. Note that the pragmatic approach relies on abductive reasoning that alternates between inductive and deductive reasoning, first using theories to explain initial observations and then assessing those theories through their ability to predict future lines of behavior (or in the case of this research, decision-

**A Pragmatic Alternative to the Key Issues in  
Social Science Research Methodology**

|                                  | Qualitative<br>Approach | Quantitative<br>Approach | Pragmatic<br>Approach |
|----------------------------------|-------------------------|--------------------------|-----------------------|
| Connection of theory and data    | Induction               | Deduction                | Abduction             |
| Relationship to research process | Subjectivity            | Objectivity              | Intersubjectivity     |
| Inference from data              | Context                 | Generality               | Transferability       |

Exhibit 3.2: A comparative framework of research approaches and the associated key issues in social science research methodology (Morgan, 2007: 72).

making). This abductive process is particularly evident in research where mixed methods are applied sequentially, such that the inductive results from the qualitative stage inform the deductive goals of the quantitative stage, or vice versa. As applied in this research,

<sup>16</sup> The pragmatic approach and the influence of these concepts are discussed in detail by Morgan (2007).



the inductive results from the interviews conducted in the first rounds of the modified Delphi Method were used to develop the third round e-questionnaire which was analyzed quantitatively. Furthermore, the overall results from the Delphi study were used to develop an industry survey that will be used in the next phase of this research; the survey will be sent out to professional organizations representing each of the stakeholder groups and will be analyzed using quantitative methods (the industry survey has been developed and pilot tested, but the survey distribution and analysis are outside the purview of the dissertation research and will be addressed in the future research section).

The intersubjective relationship between researcher and research process in the pragmatic approach acknowledges that there is no ‘complete’ subjectivity or objectivity. Instead, the researcher must alternate between frames of reference throughout the research process. For the purpose of this research, this intersubjective approach enables the assertion that there is a single concept of sustainability to be investigated within the context of real estate decision-making, while also acknowledging that real estate investors, owners, tenants and developers have their own unique interpretations of both the concept and how it is applied in real estate decision-making.

Lastly, the idea of transferability (which Morgan borrowed from Lincoln and Guba, 1985) requires that research results are usable in other contexts. Although the pragmatic idea that results should be transferable clearly differs from that of the context-specific results often developed in qualitative research, transferability and generalizability of results are often discussed together in social science research. However, Morgan makes a clear distinction between these concepts. He argues that it is not possible for research

results to be so specific (i.e. context-dependent) as to have no implications for other settings, however, he also argues that it is not possible for research results to be so universal that they can be applied to all historical and cultural settings. Instead, the pragmatist approach promotes a process that works between the specific results and the general implications of those results in a way that enables results from one method to be used in (i.e. transferable to) other contexts or settings (Morgan, 2007; Guba and Lincoln, 1985). It is the aim of this research to produce a framework for sustainable real estate decision-making that will have real world practice implications - to inform and advise practitioners in the real estate industry on how to begin, or improve, sustainability integration strategies in real estate decision-making.

## **THE PHENOMENOGRAPHIC METHODOLOGY**

Although the pragmatist approach does acknowledge the value of addressing epistemological issues in social science research methodology, this should not be confused with the metaphysical paradigm's assertion that "methodology is a system of ontological and epistemological assumptions on which research is to be based" (Noorderhaven, 2004: 91). Instead, the pragmatist approach suggests that methodology become the central issue as the "area that connects issues at the abstract level of epistemology and the mechanical level of actual methods" (Morgan, 2007: 69). In keeping with this emphasis, this discussion of the conceptual framework will continue with a review of the chosen methodology, phenomenography.

### Distinguishing Phenomenography from Phenomenology

In contrast to phenomenology with which most researchers are familiar, phenomenography is a methodology that has not before been used in real estate research. Therefore, for clarification purposes and to avoid confusion, a clear distinction must be made between phenomenography and phenomenology. Both share the Greek base ‘phainomenon’, meaning any observable occurrence or experience. Phenomenography, with the suffix *-graph*, signifies a research approach intending to describe the different ways a phenomenon is understood by a group of people (identified as A, B, and C in Exhibit 3.3). In contrast, phenomenology, with the suffix *-logos*, structures the meaning essence of a phenomenon. While phenomenography helps us to understand the qualitatively *different conceptions* of what and how people experience [conceive, perceive, understand] a range of phenomenon (Marton, 1981, 1986 and 1988, Marton and Booth, 1997), phenomenology (identified as D) enables you to understand the *shared* human experiences in the environment in which we live (Singleton and Straits, 2005).

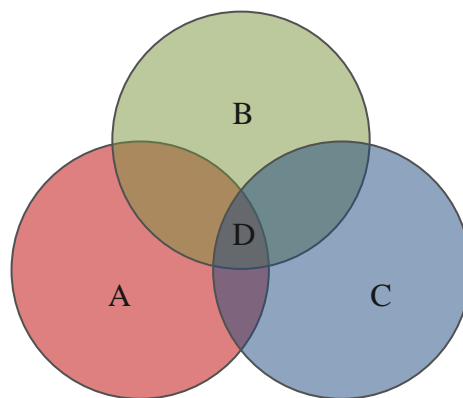


Exhibit 3.3: Phenomenography vs. Phenomenology. The circles illustrate the three different people and their experiences. A, B, and C identify the areas of interest in phenomenographic research; D identifies the areas of interest in phenomenological research.

## **Phenomenography 101 – Applied to the Research**

As noted, phenomenography studies people's different *conceptions of* a particular phenomenon; this should not be confused with their attitudes, values, thoughts or opinions *about* the phenomenon. As an example of this distinction, Larsson and Holmstrom (2007) highlights a study of Swedish anesthesiologists in which the research question was 'what is anesthesiology?' To understand this phenomenon from the practitioner's perspective, they rephrased the question to 'what do experienced anesthesiologists think about what anesthesiology is?' The research focused on concrete experiences (e.g. to control the patients' vital functions, to guide the patient through surgery and keep them safe, to lead the operating team), and deliberately steered the conversation away from expressions of their opinions about how things ought to be. Although a phenomenon - such as the previous example of how anesthesiologists think about what anesthesiology is - can theoretically be perceived or understood in an infinite number of ways, numerous studies show that in reality there are only a limited number (between 2-6) of ways of understanding a phenomenon (Uljens, 1996; Ekeblad, 1996; Marton, 1996). Each of these ways of understanding has two aspects: the 'what', which tells us what is in the subject's focus, and the 'how', which describes how meaning is created (Larsson and Holmstrom, 2007). This is in keeping with pragmatic research which emphasizes consideration of the "what" and "how" questions related to specific actions, situations, and/or consequences. As applied to this research investigating the concepts 'sustainability' and 'sustainable real estate', as well as how those concepts are integrated into the strategic decision-making process for a group of different

stakeholders, the ‘what’ and ‘how’ questions investigated in this phenomenographic study are:

1. How do the stakeholder groups *understand* the concept of sustainability?
2. How do the stakeholder groups *understand* the concept of sustainable real estate?
3. How do the stakeholder groups *apply* their understanding of the concepts of sustainability and sustainable real estate (i.e. how do stakeholders make decisions about sustainability in real estate)?

### **Phenomenographic Data Collection and Analysis**

A prescriptive format has yet to be formally established in the academic setting for conducting phenomenographic research, therefore, the adopted procedure must be clearly documented and variations in the application of the method must be explained (Bowden and Walsh, 2000). For this reason, an ‘audit journal’ (Maxwell, 2005) was kept to track the rationale behind decisions related to the methodological approach.

Larsson and Holmstrom (2007) note that the preferred data collection method in phenomenological research is open-ended interviews. Marton (2004) similarly identifies individual interviews as the dominant method of collecting data, but also cites observations, drawings, written responses and historical documents as primary data sources in phenomenographic research studies. The reason that interviews are the method, par preference, is because interviews allow us to make things which are unthematized and implicit into objects of reflection, i.e. thematized and explicit. This in turn enables the researcher to more fully explore the participants’ understanding of the phenomenon being investigated (Martin, 1994). To accommodate the preference of in-

depth interviews, the traditional Delphi Method, used as the primary data collection method in this research, was modified from the conventional use of iterative rounds of e-questionnaires or written surveys. Instead, in-depth, semi-structured interviews with expert panelists were substituted in place of the e-questionnaire during the first and second rounds, while the last round was conducted in the traditional manner using an e-questionnaire. This modification to the traditional Delphi Method enabled the study to bring together researchers from across professional contexts and enabled experts to offer richer and more nuanced commentary on the phenomena being investigated.

The analysis of data in phenomenographic studies can be done in several ways (Sandberg, 1994; Dahlgren and Fallsberg, 1991), however, all of them maintain the essential structural and referential aspects of the phenomenon – the ‘what’ and ‘how’ aspects and include an iterative process of analysis. Larsson and Holmstrom (2007: 57) give a detailed description of the data analysis method they employed:

1. Read the whole text.
2. Read again and mark where the interviewee gave answers to the three main interview questions.
3. In these passages look for *what* the focus of the [respondent’s] attention is and *how* she/he describes her/his way of working. Make a preliminary description of each [respondent’s] predominant way of understanding the work.
4. Group the descriptions into categories, based on similarities and differences. Formulate the categories of description.
5. Look for non-dominant ways of understanding.
6. Find a structure in the outcome space.
7. Assign a metaphor to each category of description.

## **Categories of Description and Outcome Space**

The categories of description (as developed in Step 4, above) are abstractions of the different ways of understanding that have been identified by the researcher, and they describe the different ways the phenomenon can be understood at a collective level. Categories of description require that the ways of understanding emerged from more than one observation and that they be mutually exclusive (Larsson and Holmstrom, 2007; Marton, 1981). As such, in this research study, ways of understanding must have emerged in at least two Delphi interviews and/or e-questionnaire responses to create a category of description. The list of the categories of description constitutes the outcome space and is generally considered to be the results of the study. However, the categories in the outcome space are often related to each other in some hierarchical way (Marton and Booth, 1997). Larsson and Holmstrom (2007) propose that structuring the outcome space<sup>17</sup> to illustrate the internal relationships can be a final step in the phenomenographic analysis, either as a result of theoretical analysis or inferred from the data. In this study, the outcome space is diagrammed to consider the internal relationships of the categories of description for each of the research questions above. In addition, the results were used to create a series of lessons learned as well as a theoretical framework to aid real estate industry practitioners in sustainable real estate strategic decision-making and assessment.

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<sup>17</sup> Larsson and Holmstrom (2007) highlight a phenomenographical study performed in 2003 and compare the phenomenographical results - a hierarchical outcome space diagram - with the results generated using phenomenological analysis for the same study.

## THE DELPHI METHOD<sup>18</sup>

### Rationale for Selection of the Delphi Method

This research inquiry aims to address a significant gap in the real estate research literature. A paucity of research related to sustainability decision-making in commercial real estate indicates this study will fill an important void and that it will aid practitioners in their efforts to include sustainability implementation in their strategic decision-making process. In emerging fields, such as strategic decision-making related to sustainability integration in real estate, where scientific laws [or best practices] have not yet been developed, the use of expert testimony as data is acceptable to establish a foundation for research (Helmer and Resher, 1960; Linstone and Turoff, 1975; Fowles, 1978).

The creation of a sustainable real estate decision-making framework is a complex task that will need to consider both the *facts* and the *values* associated with the breadth of issues and principles related to sustainable real estate. While these tasks could be accomplished through an in-depth literature review and industry-wide survey, the results would not capture the complexity of the issues and the related underlying values and needs driving the sustainability decision-making process. Nor would these more traditional research methods enable the kind of interactive group process necessary to merge and synthesize the interests of the various stakeholder groups in order to create a

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<sup>18</sup> The most commonly cited book on the Delphi Method is by Linstone and Turoff (1975). Other useful references include Fischer (1978), Fowles (1978), Adler and Ziglio (1996), Schmidt (1997), Okoli and Pawloski (2004) and Keeney et al (2006).



framework for sustainable real estate strategic decision-making for the entire real estate industry.

Therefore, to analyze these aspects effectively, a relatively new qualitative research method for real estate analysis, the Delphi Method, will be used to help facilitate anonymous<sup>19</sup> group interaction and decision-making. “Delphi is a method of gathering and refining the opinions of experts to obtain consensus” (Fischer, 1978: 64), and:

...captures a wide range of interrelated variable and multidimensional features common to most complex problems...documents facts and the opinions of the panelists, while avoiding the pitfalls of face-to-face interaction, such as group conflict and individual dominance (Gupta and Clarke, 1996: 186).

The Delphi Method recognizes expert opinion as legitimate and useful inputs in generating forecasts, but also that single experts sometimes suffer biases; as a result, group meetings suffer from ‘follow the leader’ and consensus building tendencies as well as a reluctance to abandon previously stated opinions (Gatewood and Gatewood, 1983; Fowles and Fowles, 1978). The Delphi Method was first developed in response to problems associated with conventional group opinion assessment techniques, such as focus groups, which can encounter problems of response bias due to the dominance of powerful opinion-leaders (Wissema, 1982). Using the Delphi Method helps overcome these limitations by facilitating quasi-anonymous group interaction, enabling panelists to respond to the merit of the information versus where/who the information is coming

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<sup>19</sup> Because of the iterative nature of the Delphi method, true anonymity cannot be guaranteed. While individual’s responses are unknown to other panelists, they *are* known to the researcher. Keeney et al. (2005) termed this phenomenon ‘quasi-anonymity’.

from. Martino (1978, 1983) notes that among the advantages of using the Delphi Method over conventional face-to-face panel/focus groups is that the traditional problems related to group dynamics are avoided. Material is filtered and synthesized by a ‘panel director’; as a result, the Delphi format enables people to respond to the merit of the information regardless of where/who the information is coming from. Consequently, the Delphi Method removes biasing effects of a participant’s personality and/or their role in the real estate sector from the information being given, thus limiting non-relevant objections to the discussion. For these reasons, the Delphi Method has been selected to help facilitate anonymous group interaction and merit-based decision-making.

### **Origins and Evolution of the Delphi Method**

The Delphi Method was initially developed as part of a series of post-war studies in the 1950s by the Douglas Aircraft Company to help forecast the impact of technological development on social and economic re-generation (Linstone and Turoff, 1975; Fowles, 1978). A philosophical paper by RAND researchers Helmer and Rescher (1959) provided a “Lockean-type justification for the Delphi technique” (Linstone and Turoff, 1975: 11) and helped create the framework of principles which researchers began utilizing for non-defense related research in the early and mid-1960s. Recognizing that there was a need for research in emerging fields where scientific laws had not yet been developed, Helmer and Rescher (1960) argued that the testimony of experts is permissible, however, the problem they identified was *how* to use this expert testimony -

specifically, how to *combine* the testimony of a number of experts into a single useful statement.

The theoretical and methodological basis for forecasting was elaborated in a subsequent series of papers produced by the project. These papers supported the argument that when there is no established evidence base, emergent fields of enquiry could begin to develop an evidence base through capturing and synthesizing the opinions of domain experts (Linstone and Turoff, 1975; Fowles, 1978). The Delphi Method was therefore an attempt to 'align' the sometimes conflicting positions of experts into a coherent and unified perspective (Turoff and Hiltz, 1996). Perhaps the clearest discussion of the use of expert judgment in the Delphi Method comes from Gutierrez (1989). In a multi-modal search of articles, they identified 463 articles published between 1975-1994 in which the Delphi Method is treated either as the primary subject (55%) or as a secondary subject (45%). They classified each of the papers in the study as either an application paper or a methodology paper, and also sorted the paper by discipline. The Delphi Method has most frequently been applied in research related to nursing, education, and curriculum development, however, Gutierrez identified seven papers in which the Delphi technique was applied in real estate research. Of particular interest to this research is a recent study by Pivo (2008) who examined the criteria for responsible property investment.

Turoff and Hiltz (1996:56) list common misconceptions about the Delphi Method:

- Delphi is a method for predicting future events;
- It is a method for generating quick consensus by a group;
- It is the use of survey to collect information;
- It is the use of anonymity on the part of the participants;
- It is the use of voting to reduce the need for long discussions;
- It is a method for quantifying human judgment in a group setting;

The authors note that although some of the aforementioned points are sometimes true, other points (e.g. generating consensus) actually conflict with the intent of the Delphi Method as “a communications structure aimed at producing detailed critical examination and discussion, not forcing a quick compromise...The essence of the Delphi Method, then, is the structuring of the group communication process” (ibid: 57). This is supported by Gutierrez, who states that “unlike other planning and forecasting methods, Delphi’s goal is not to elicit a single answer or to arrive at a consensus, but simply to obtain as many high-quality responses and opinions as possible on a given issue(s) from a panel of experts to enhance decision making” (1996: 186). This statement idea, that the Delphi Method is not about building consensus, is in direct contrast to the majority of the literature, which argues that the “*raison d’etre* for using the Delphi technique is to gain consensus or a judgment among a group of perceived experts on a topic” (Keeney, Hasson and McKenna, 2005: 209-210). Dorussen, Lenz and Blavoukos (2005) go so far as to argue that higher levels of consensus among experts indicate increased reliability and validity of the data.

This research does not attempt to build consensus among panelists, as the purpose of the research is to investigate the categorically different ways of understanding the concepts of sustainability and sustainable real estate, as well as how these concepts are applied in the decision-making strategies related to integrating sustainability initiatives in commercial real estate.

### **The Delphi Method - How it Works**

In a nutshell, the Delphi Method is an iterative, structured, group interaction process with an integrated feedback mechanism (Skulmoski and Hartman, 2007). The Delphi process exists in two distinct formats: 1) the conventional Delphi using paper/e-questionnaire and 2) the Delphi Conference (Linstone and Turoff, 1975). The first process is based on a structured process for collecting and synthesizing knowledge from a group of experts by means of a series of questionnaires (postal, email or e-survey) accompanied by controlled opinion feedback (Adler and Ziglio, 1996). The questionnaires are presented in the form of an anonymous and iterative ‘discussion’ procedure (detailed below). This form of Delphi process “attempts to shift a significant portion of the effort needed for individuals to communicate from the larger respondent group to the smaller monitor team” (Linstone and Turoff, 1975: 5). The second process “replaces the monitor team to a large degree by a computer which has been programmed to carry out the compilation of group results...it has the advantage of eliminating the delay caused in summarizing each round” (ibid, 5). These computer systems support group communications in either a synchronous (Group Decision Support Systems,

DeSanctis and Gallupe, 1987) or an asynchronous manner (Computer Conferencing). This introduction of the Computer Mediated Communication Systems has created additional opportunities for the use and application of the Delphi Method (Hiltz and Turoff, 1978; Rice, 1984; Turoff, 1989; Turoff, 1991). A modified version of the conventional Delphi Method was utilized in this research; modifications are explained in detail in Chapter Four. As the conventional Delphi method is the basis for the method used in this research, a more detailed description of the process is discussed next.

The conventional Delphi method uses several rounds of ‘pen and paper’ surveys, with surveys in subsequent rounds refined based on feedback from participants on the results of the previous round. After the first round of questionnaires are returned and analyzed, the results are summarized and sent back to the respondent group for feedback along with a second questionnaire, which is generated to gain further feedback on emerging themes. A summary report of the results is then written and sent back to the respondents after each survey round. The summary report may contain new questions which have emerged based on additional research conducted while the survey was open, or related to topics/themes identified during the analysis of the responses from previous rounds. Respondents then have a set period of time to review the summary report and give further feedback; they also have the opportunity to shift their viewpoints based on the findings from the first ‘round’ of the report and make adjustments to the summary if they are in disagreement with any statements. As a result of the process, a convergence of opinion begins to emerge, and after several ‘rounds’ a stabilized agreement emerges. It is important to note that the group ‘agreement’ may reflect both agreement and/or

disagreement on the various sub-topics being investigated (Pivo, 2008); sometimes panelists just agree to disagree.

For both the conventional Delphi and Delphi conference processes, the key elements of the process include: 1) structuring information flow; 2) feedback to the participants; and 3) anonymity for the participants (Fowles, 1978). Both processes also experience four distinct phases: 1) topic exploration, where each participant contributes information they feel is important to understand the topic of investigation; 2) understanding of group perspective, where areas of agreement and disagreement are identified, as well as developing an understanding of relative terminology used by participants - such as feasibility, importance, level of impact; 3) exploration of disagreements, where the researcher attempts to understand underlying rationale and to evaluate them; and 4) the final evaluation, which occurs when all of the respondents' information has been analyzed and the evaluation/summary has been sent back for final agreement by the participants (Linstone and Turoff, 1975).

## **INSTRUMENT DEVELOPMENT AND TESTING**

### **The Scope**

In keeping with the abductive nature of the pragmatic approach, mixed methods will be used for the scope of the research as it extends into the next phase. As Green, Caracelli and Graham (1989) note, a mixed methods approach is appropriate when the researcher aims to add breadth and depth to an area of study and thereby gain a new perspective on the particular phenomenon being studied. A mixed methods approach

also provides a research framework that naturally utilizes two different methods in the research study so that methodological triangulation<sup>20</sup> of the research is attained (Morse, 1991; Tashakkori and Teddlie, 1998; Yin, 2003). The primary focus of this research is the first phase of a larger mixed methods study. The use of mixed methods is appropriate for this research because it aims to shed light on the breadth and depth of issues influencing sustainable real estate decision-making.

As indicated, a modified Delphi Method was used in this study to create the dataset of observations. The modified Delphi Method is a mixed methods approach in itself; the qualitative approach in that the first two rounds utilizes a lengthy, iterative phenomenographic analysis of the interviews with the Delphi panelists, while the third round is a quantitative analysis of the Delphi e-questionnaire. The combined Delphi observations are then used to develop a theoretical framework for sustainable real estate strategic decision-making and assessment. The mixed methods approach also extends to the next stage of this research. As discussed in the future research section of the final chapter, the next stage of this study will be an industry survey which aims to build on the Delphi study by providing statistically valid, empirical feedback on the data from the Delphi panel from a larger sample of real estate professionals. The distribution of the survey to industry groups and the quantitative analysis of the survey are outside the purview of the dissertation research as will be pursued as follow-up research.

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<sup>20</sup> “Methodological triangulation involves the use of both qualitative and quantitative methods and data to study the same phenomena within the same study or in different complementary studies” (Tashakkori and Teddlie, 1998: 18).



## USE OF EXPERTS

As experts are the basis for the Delphi Method used in this research, the term ‘expert’ must be defined, the means of selecting them specified, and the validity of the use of experts in social science research must also be considered.

### What Makes an Expert – and What Criteria are Used in Their Selection?

Keeney, Hasson and McKenna state that “there are no universally agreed criteria for the selection of experts...there is no magic formula to help researchers decide on who are the experts and how many there should be” (2006: 208-209). Other research applying the Delphi Method also struggled with defining ‘expert’ for the purpose of selecting their panel participants; many research papers utilizing expert information did not include any discussion of the definition or selection criteria for the experts included in their studies. While the Delphi Method can be modified and applied in a number of ways, several universal challenges are faced by all researchers using the technique - among them are the selection of experts and the challenge of ensuring quasi-anonymity (ibid).

The Oxford English Dictionary and Webster’s Dictionary, respectively, define an expert as “a person who is very knowledgeable about or skilful in a particular area” and “one who has acquired special skill in or knowledge of a particular subject through professional training and practical experience.” To understand what an expert is, we must therefore first understand what knowledge is. Research in education commonly divides expert knowledge into three components: 1) *formal (or declarative) knowledge*, which constitutes the core knowledge of a profession; 2) *practical (or procedural)*

*knowledge*, an instinctive knowledge of how to apply formal knowledge; and 3) *self-regulative knowledge*, which consists of an ability to reflect and evaluate skills, actions and factual knowledge (Tynjala, 1999). Tynjala further distinguishes between *expert knowledge* and *high-level expert knowledge*. Expert knowledge synthesizes the aforementioned components of knowledge into a coherent body of knowledge that can be used to assess situations/problems and make judgments, while high-level expert knowledge integrates and assimilates theoretical and practical knowledge. This research seeks to tap into the expert level knowledge of the Delphi panelists, and to provide the industry with high-level expert knowledge by assimilating the academic research literature with the expert knowledge of the participants to provide a theoretical framework for strategic sustainable real estate decision-making.

Anderson (1978) similarly distinguishes between levels of knowledge. The first being the simple recognition of an issue and the ability to search for a solution, the second being an exacting use of previously acquired knowledge to provide a solution through conscious calculation. Building on that definition, Sternberg (1997) argues that an expert has multi-dimensional expertise which includes, to varying degrees, the following attributes: 1) advanced problem-solving processes; 2) an extensive amount of knowledge; 3) advanced knowledge organizational abilities; 4) an ability to use knowledge effectively; 5) an ability to create new knowledge and build/expand on existing knowledge; 6) automatized actions; and 7) practical ability related to advancing in their particular field. Keeney, Hasson and McKenna (2005) support this argument and note that for these reasons the selection of experts must be a purposeful sample.

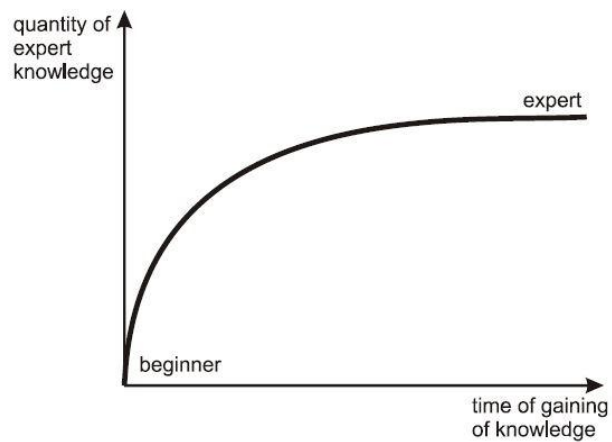
In Chase and Simon's (1973) seminal investigation of skilled memory, they find that 'experts' who have extensive experience are able to develop a larger number of complex patterns to rapidly encode, store, and retrieve information within the domain of their expertise. These patterns can then be accessed in the future when similar scenarios are encountered to determine which actions should be taken. They delineate three principles of skilled memory: 1) the *meaningful encoding principle*, which states that experts utilize previously acquired knowledge to durably encode knowledge needed to perform familiar tasks successfully as well as forming more elaborate and accessible memory representations than novices; 2) the *retrieval structure principle*, which states that experts develop memory mechanisms to facilitate the retrieval of information stored in long term memory; and 3) the *speed up principle*, which states that with practice, long term memory encoding and retrieval operations are able to approach the speed and accuracy of short term memory storage and retrieval.

Chi, Glasser and Rees (1982) support these findings and note that the distinguishing characteristics of experts extend beyond the quantity and complexity of their accumulated knowledge to the qualitatively different way that they organize both their acquired knowledge and its representation. Experts don't automatically extract patterns and retrieve information directly from memory when encountering challenging problems; instead, experts create new encodings of selected relevant information in working memory which they use to plan and evaluate alternative courses of action (Ericsson and Lehmann, 1996). Experts' knowledge is encoded around key domain-related concepts and solution procedures that allow rapid and reliable retrieval whenever

stored information is relevant. In contrast, less skilled subjects' knowledge is encoded using everyday concepts that make the retrieval of even their limited relevant knowledge difficult (Ericsson, 2000).

To determine whether an expert is 'knowledgeable' researchers have considered the quantity of experience (Anderson, 1978), the deliberate training to improve technique and/or performance (Ericsson and Charness, 1994; Ericsson, Prietula and Cokely, 2007), the exceptional achievements within the defined area of interest (Chi, Glasser and Farr, 1988) and the knowledge gained from active, practical problem-solving (Rohrbaugh and Shanteu, 1999). While quantity of experience is fairly easily measured, it can be unreliable in that it does not account for the quality of the experience. Anderson (1978) surmised that it takes 10,000 hours of focused practice to acquire/develop an expert skill at the top level (an example of this rule is the story many young athletes are told of Michael Jordan, who spent hours each day shooting free throws and 'deliberately' perfecting his stance). Ericsson, Prietula and Cokely (2007) note that this type of 'deliberate practice' involves two kinds of learning: 1) improving skills you already have and 2) extending the reach and range of your skills. Due to the enormous concentration required to undertake such intense, deliberate practice, few people are able to engage in developing their expertise for more than four-five concentrated hours per day. Even those rare professionals who are able to maintain the stamina to sustain a focus of deliberate practice throughout the entire workweek would need a minimum of ten years to acquire the 10,000 hours of focused practice necessary to develop expertise in their

field.<sup>21</sup> Meystel and Albus (2002), however, note that developing expert knowledge is not a linear process, but an exponential one (see Exhibit 3.4). As a result, the majority of knowledge needed to acquire a sufficient quantity of knowledge is gained within the first



few years, with the remainder gained slowly over time. Ultimately, the

Exhibit 3.4: Expert Knowledge Acquisition Curve. The exponential relationship between quantity of expert knowledge and the time spent acquiring that knowledge (Meystel and Albus, 2002).

validity and reliability of expert information depends on the expert panelists to be knowledgeable of the subject and be able to represent multiple points of view (Ndour, Force and McLaughlin, 1992); therefore, it is important to qualify experts before proceeding with the research.

Within the dissertation research, the question of who is an expert is further complicated by the complexity of the topic, sustainability; the relatively short period of time in which sustainability has been an issue of consideration in the commercial real estate industry, less than a decade; and the breadth of scope to which the topic of sustainability is being investigated, including most of the stakeholders engaged in the real estate process. Based on the literature and on previous studies using expert information as data (Beazley et al., 2010; Soer et al., 2008; Skulmuski et al., 2007; Pivo, 2007; Okoli

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<sup>21</sup> This calculation assumes a professional working 8 hours/day, 5 days/week for 50 weeks per year. This allows two weeks of holiday which is the standard holiday given to professionals in the United States.

and Pawlowski, 2004; Meystel and Albus, 2002; Tynjala, 1999; Gupta and Clarke, 1996; Anderson, 1978), the following criteria will be used to qualify the expert panelists:

- ***They must have more than ten years of industry experience, three of which must in some way relate to sustainability.*** Based on Anderson (1978), a minimum of ten years is required for someone to attain the 10,000 hours of focused practice required to be an expert (in the real estate industry). Because sustainability is a relatively new phenomenon in commercial real estate, three years seems a reasonable amount of time based on Meystel and Albus (2002), who noted that the majority of expert knowledge is learned within the first few years.
- ***They must hold an executive level position within their organization,*** an indicator that, internally, they are respected as an expert on sustainability issues.
- ***They must be actively engaged in strategic decision-making and sustainability issues*** within their own organization and/or be involved with an industry organization actively engaged in developing tools for strategic decision-making as it relates to some aspect of sustainable commercial real estate (e.g. be a member of the UNEP-FI Property Working Group or Urban Land Institute Responsible Property Investing Council).
- ***They must have a proven track record in professional practice.*** This is measured through either a) being published in their field and cited by peers or b) being recognized as an industry expert/leader in publications by peers.
- ***They must bring to the table both a general knowledge of the issues and be able to represent a broad range of values and priorities.*** In other words, they must understand the broader issues of sustainability as it applies to multiple stakeholder groups and be able to articulate perceived areas of overlap and discrepancies between the priorities of the various stakeholder groups.
- ***They must have been referred by at least one other member of the expert panel.***

## **Expert Information as a Useful Source of Data**

As noted earlier, expert judgment and expertise is an acceptable source of data when there is no established evidence base related to a specific research topic (Linstone and Turoff, 1975; Fowles, 1978). Expert information can be obtained through a variety of methods, including: focus groups, interviews, surveys and the Delphi method. Dorussen, Lenz and Blavoukos note that:

[Expert interviews] allow researchers to bridge the divide between case studies and the comparison of a large number of [cases] based on more general and publicly available data. Further, expert interviews give the researchers control over the dimensions that are central to the comparative research. Consequently, a clear theoretical framework can be used to facilitate rigorous comparisons (2005: 317).

Expert judgment and knowledge has been most frequently used as data in research in the fields of defense (Roberts, 1969; Gilbride, 2002), education and curriculum development (Dailey and Holmberg, 1990; Volk, 1993; Tynjala, 1999), nursing (Hasson, 2000; McIlpatrick and Keeney, 2003; Keeney, Hasson and McKenna, 2006), conservation planning (Beazley, Baldwin and Reining, 2010); political science (Dorussen, Lenz and Blavoukos, 2005), and planning, policy analysis and long-range forecasting (Gupta and Clarke, 1996). Pivo (2008), examining the criteria for responsible property investment, is the only identified study using experts as part of a Delphi process in real estate research.

## **TESTING SOUNDNESS IN PRAGMATIC RESEARCH**

Within the quantitative research perspective, ‘validity’ concerns must address four criteria: internal validity, external validity, construct validity (objectivity) and measurement validity (reliability). Noting that some qualitative philosophical perspectives reject the concept of ‘validity’ as used in traditional quantitative research, Trochim (2006) offers a thorough discussion of alternative criteria for assessing the ‘soundness’ of qualitative research. Pragmatists are among the group of researchers that utilize the alternative standard, rather than the traditional quantitative criteria of validity, for judging the quality of qualitative research (Morgan, 2007).

Guba and Lincoln (1994) offer an alternative method for judging the ‘soundness’ of results obtained from qualitative research. They propose four criteria that more aptly reflect the underlying assumptions of qualitative research, and offer a comparison of these criteria with the corresponding criteria that are typically used in traditional quantitative research. Trochim (2006) provides a review of both sets of criteria as well as the arguments both for and against the use of the traditional criteria in qualitative research (Exhibit 3.5). A brief comparison of the traditional and alternate validity criteria is included below. For the purpose of addressing threats to validity of the results from the Delphi study, the alternate validity criteria will form the basis of the discussion.



| <b>A Comparison of Criteria for Judging Quantitative &amp; Qualitative Research</b> |   |
|---|---|
| <b>Quantitative Research ‘Validity’</b>   | <b>Qualitative Research ‘Soundness’</b> |
| Internal Validity   | Credibility                             |
| External Validity   | Transferability                         |
| Reliability   | Dependability                           |
| Objectivity   | Confirmability                          |

Exhibit 3.5: A Comparison of Criteria for Judging Quantitative and Qualitative Research (Trochim, 2006).

While internal validity is concerned with whether the relationships in the research are causal, credibility is concerned with whether the results are believable from the perspective of the research participant. Because much of qualitative research deals with describing or understanding a particular phenomenon from the perspective of those involved with the study, “the participants are the only ones who can legitimately judge the credibility of the results” (Trochim, 2006: Qualitative Validity).

External validity is concerned with whether research results can be generalized to other persons, places, or times. This is often done through a discussion of the statistical sampling technique. As discussed earlier, the pragmatic approach emphasizes research transferability (Morgan, 2007). Transferability can be enhanced by thoroughly describing the research context and assumptions central to the research so that other researchers may make informed judgments as to whether the research transfers to the context in which they are working (Trochim, 2006).

Reliability is concerned with whether the research results can be replicated if the study is repeated. One aspect of reliability is the consistency of measurement, such as inter-rater reliability, test-retest reliability, parallel-forms reliability, and internal consistency reliability. A problem with the concept of reliability is that with the element of time, a study cannot actually be repeated; the researcher can therefore never actually study the same thing, even if the method and measures are duplicated. In the qualitative research area, dependability emphasizes the need to account for the contextual state of flux within which the research occurs. Changes to the context and how these changes affect the research must be documented and thoroughly described (Trochim, 2006).

Objectivity in quantitative research requires that the researcher put aside their biases and beliefs so that they might be able to see the world as it really is. In contrast, qualitative research embraces the idea that researchers bring their own unique perspectives to the research, but requires that researchers acknowledge their biases and assumptions up front so that others can be informed of that perspective when assessing the research. Confirmability is therefore concerned with the degree to which the results are affirmed. Some strategies for enhancing confirmability are: checking and rechecking the research data, document and describe prior instances which contradict observations, and conducting a data audit examining the consistency of the data collection and analysis procedures and identifying possible opportunities for bias and distortion (Trochim, 2006).

## **METHODOLOGICAL LIMITATIONS**

The Delphi Method is useful in overcoming some of the challenges faced by traditional focus group research; however, it is important to note that there are also challenges that need to be considered when using the Delphi Method. The key problems reported include: 1) poor internal consistency and reliability of judgments among experts, making the reproduction of forecasts developed from the results difficult; 2) sensitivity of results to both the ambiguity of questions used in the questionnaire (and interviews), as well as to respondent reactivity to the questionnaires; and 3) difficulty in assessing the degree of expertise held by participating experts (Makridakis and Wheelright, 1978).

The modification to the Delphi Method to include in-depth interviews specifically addresses the first limitation. In addition to pre-testing the interview questions, the use of a semi-structured interview format allowed both the researcher and the expert to clarify any topics of discussion that were not fully understood. The third round e-questionnaire was pre-tested with the initial pilot group as well as with members of the dissertation committee. Together, these measures addressed the second limitation identified in the literature. Lastly, to address the final limitation of the Delphi Method, a checklist was developed to qualify the experts selected to participate in the expert panel. The next chapter discusses in more detail how the conceptual framework outlined in this chapter was applied in the dissertation.

## CHAPTER FOUR

### RESEARCH DESIGN: STRATEGIES FOR UNDERSTANDING

#### SUSTAINABLE REAL ESTATE DECISION-MAKING

#### **THE PURPOSE OF THE RESEARCH**

This research is both exploratory and descriptive in nature. It seeks to understand how the concepts ‘sustainability’ and ‘sustainable real estate’ are understood by stakeholders in the real estate process, and to describe whether/how these concepts are integrated into the commercial real estate strategic decision-making process. Sustainability issues apply to all property - but property is a complex asset to real estate investors, occupiers and developers, all of whom have ideas about how sustainability can be implemented, rely on different criteria to make decisions and look for different potential outcomes. While a multitude of assessment and rating tools have evolved since the 1992 Rio Earth Summit, there is still a paucity of literature related to how the various stakeholders in the real estate process actually make decisions related to sustainability in the commercial real estate industry, as well as what criteria are used to generate those decisions for each of the various stakeholder groups.

The purpose of the research is therefore threefold: 1) To gain an understanding of how the concepts ‘sustainability’ and ‘sustainable real estate’ are understood by each of the stakeholders in the real estate process, 2) To gain an understanding of how these concepts are applied in and integrated into the strategic decision-making process, specifically related to real estate decisions; and 3) To gain an understanding of the criteria

used by the various stakeholder groups in the real estate process to make decisions about sustainability in commercial real estate, as well as the indicators used to assess sustainable real estate, so that each of the stakeholder groups can better understand the decision-making process of their collaborators in the real estate process. By understanding how/whether sustainability issues are being integrated in the decision-making process, the research aims to help industry practitioners in the following manner:

- Aid in making investment, management, occupancy and development decisions
- Increase the transparency of the sustainable real estate asset class for the various stakeholders in the real estate process
- Help the various stakeholders in the real estate community more easily assess whether an asset meets their goal of only investing/managing/occupying/developing 'green' buildings
- Increase competition in the 'green' real estate market by improving the ability for actors to compare sustainable real estate investments

## **RESEARCH QUESTIONS**

- What does the concept 'sustainability' mean to each of the stakeholder groups? How is the concept 'sustainability' understood by the different stakeholders?
- What does the concept 'sustainable real estate' mean to each of the stakeholder groups? How is the concept 'sustainable real estate' understood by the different stakeholders?
- How do the stakeholder groups apply their understanding of the concepts 'sustainability' and 'sustainable real estate' (i.e. how do stakeholders integrate sustainability related issues in the decision-making/strategic planning process related to commercial real estate)?
  - What are the criteria used to make decisions about 'sustainable real estate' by each of the different stakeholder groups?

- What are the indicators used to assess ‘sustainability’ by each of the different stakeholder groups?
- How/why do these criteria and indicators inform the decision-making process differently depending on the role of the stakeholder in the real estate process?
- What are the barriers to making sustainable real estate criteria and indicators more transparent and more easily comparable?

## **RESEARCH DESIGN**

### **Overview**

The dissertation utilizes a pragmatic approach for the research in which the phenomenographic methodology was used to guide the analysis of the data created using a modified Delphi Method. The research design and methods used to carry out the research are diagrammed in Exhibit 4.1, below. The research began with a thorough review of the existing literature (see chapter two) and a content analysis of the leading building assessment rating systems (LEED and BREEAM); this led to a preliminary list of sustainability criteria/indicators being created (see Exhibit B-1 in Appendix B). Using the preliminary findings from the literature review and content analysis, a pilot study was conducted with five experts - each representing a breadth of industry experience - to test the modified Seidman interview format and interview questions. As a result of the pilot study, the scope of the research and the research questions were refined. The dissertation utilized an iterative, modified Delphi Method. In the first round, Delphi interviews were conducted with fourteen industry experts, representing five key real estate stakeholder groups, to understand how the concepts of ‘sustainability’ and ‘sustainable real estate’

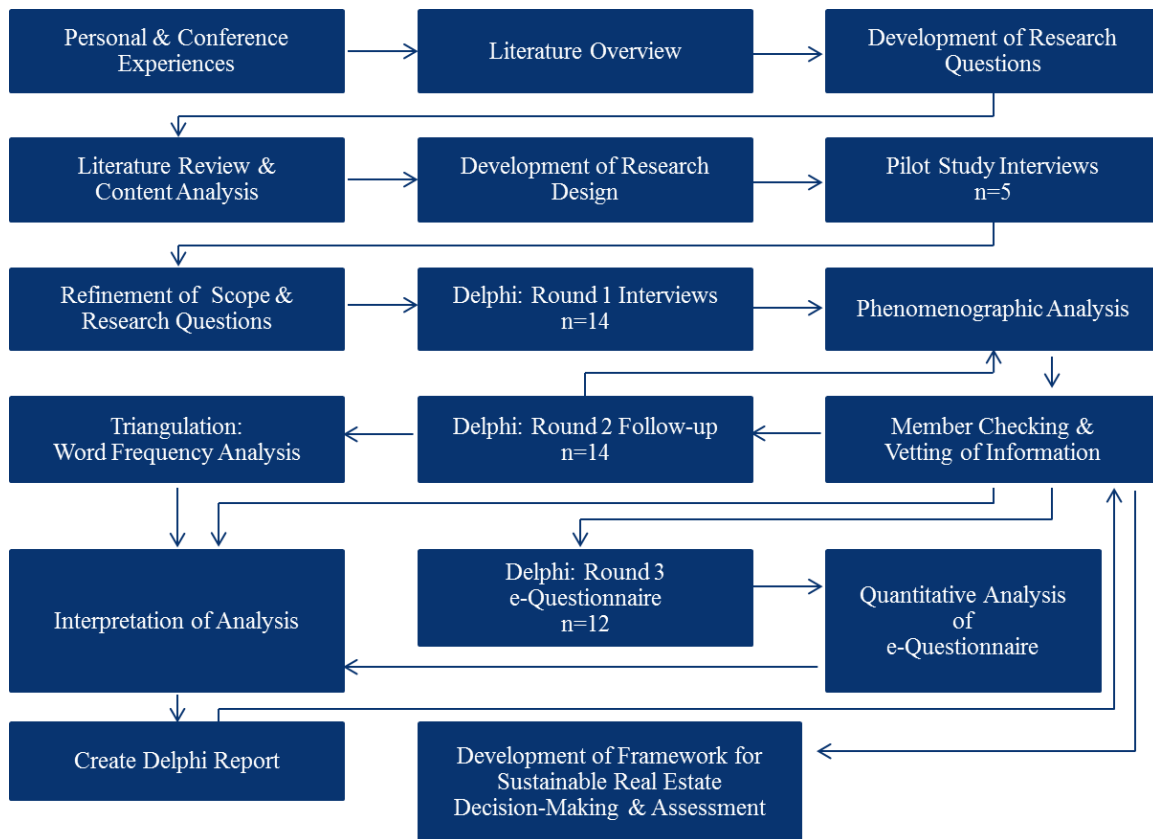


Exhibit 4.1: Outline of Research Process for the Modified Delphi Study. This diagram outlines the individual steps of the research investigating the key strategies of sustainability decision-making in the United States.

were understood. A second round of interviews was conducted to follow-up on specific topics identified in some interviews and not in others, as well as to provide panelists with a summary of the observations and an opportunity to comment on topics brought up by other panel participants. Due to availability constraints, email communication was substituted for phone interviews for some of the panelists. In addition to offering insight into the different ways of understanding the concepts of ‘sustainability’ and ‘sustainable real estate’, the interviews enabled the list previously identified of sustainability criteria (Exhibit B-1 in Appendix B) to be refined; the final list was then used to create some of

the survey questions in the third round of e-questionnaire. Ultimately, the modified Delphi process offers practitioners an understanding of how the concepts of ‘sustainability’ and ‘sustainable real estate’ are integrated into the decision-making and strategic planning process for each of the following real estate stakeholder groups:

- REIT Managers/Sustainability Strategists (public investment);
- Investment Fund Managers/ Sustainability Strategists (private investment);
- Owner-Occupiers/Corporate Users;
- Tenants (via real estate management firms that represent large market segments);
- Developers.

### **Content Analysis of Building Assessment Rating Systems**

At the same time as the review of the academic and professional sustainable real estate literature, a content analysis was conducted on the LEED Existing Buildings: Operations & Management (EBOM) and BREEAM In-Use building assessment rating systems. The assessment systems focusing on existing building have been chosen for several reasons:

- 1) Much of the previous literature comparing building assessment rating systems has focused on BREEAM Offices and LEED-NC and very little has looked at the existing building assessment rating systems;
- 2) Globally, existing buildings are the leading producers of CO<sub>2</sub> emissions; if we are to make target goals for GHG emissions and energy usage reduction then modifications to existing buildings must be considered;



- 3) New office floor space will only grow 1-2% per year as a percentage of total existing floor space so many developers, investors, users are focusing on existing building modifications to meet CSR sustainable real estate goals;
- 4) There is a need for increased focus on existing buildings (roughly 98% of the building stock at any given time) if we want to achieve global sustainability and GHG emissions goals.

In addition, with the recent recession and corresponding downturn in new construction, USGBC reports a significant increase in applications for LEED EBOM – another reason that the content analysis was focused on the existing building rating assessment systems.

Commonalities between the two assessment systems were identified and integrated into the sustainability criteria list created from the literature, and the differences between the systems were highlighted and included in the discussion during the expert interviews to see how they might be integrated into the list.

### **Panel Composition**

The interview participants were selected as a purposeful stratified sample of experts in each of the stakeholder groups. In contrast to traditional survey research which utilizes random sampling, the Delphi Method capitalizes on the knowledge of participants with specific expertise relevant to the research study (Keeney, Hasson and McKenna, 2006; Pivo, 2008). The experts were selected based on the criteria developed to qualify the panelists as ‘experts’, outlined in chapter three. Ultimately, each of the panelists brings both a general knowledge of the issues being investigated and represents a broad range of industry values and priorities. On average, the Delphi expert panel had almost

21 years of industry experience and 11 years of experience in the sustainability arena. One expert had over 40 years of experience in the industry while the least experienced had 9 years; in the sustainability arena, one expert had over 27 years of experience and the least experienced had over 5.5 years. This provides substantial evidence that the expert panelists represent a significant amount of experience and knowledge in both the commercial real estate industry and, more specifically for this research, sustainable real estate.

As previously noted, some experts represented multiple stakeholder perspectives based on their industry experiences and/or because the company they represent engages in activities representing multiple stakeholder groups. A minimum of two experts were selected to represent each stakeholder group; the experts representing each stakeholder group are all currently working in that industry sector. Most participants were based in the United States (US); however, some experts were located internationally. These internationally-located experts were selected either because they were the Global Sustainability Officer (or the equivalent) of a larger organization or management consultancy group, or because they represent a global policy group influential in created sustainable real estate policy that is also influential in the US. As a result, the inclusion of these experts from non-US countries broadened the panel's sphere of influence.

Pilot study participants<sup>22</sup> and the literature review in chapter two (the *GRESB 2012 Report*, in particular) were used to select the Delphi expert panel. The GRESB 2012 Report is a list of the leading corporations and investment companies who are integrating sustainability best practices and performance assessment in their real estate portfolios in each of the global markets (The Americas, Europe, Asia and Oceania). In the US, the Thomas Property Group (listed investment company) was ranked as the 2012 Office Sector sustainability leader, while Bentall Kennedy (private investment company) was listed as the 2012 Diversified Sector leader. Both were represented on the Delphi panel. After experts were selected for the Delphi panel, each panelist was also asked to nominate other experts that the expert felt would be good additions to the expert panel. Some recommended experts who had already been selected. In the end, each of the Delphi expert panelists was recommended by at least two of the other experts on the Delphi panel and some were recommended as many as five times. A full list of the expert panel participants and the stakeholder groups they represented is available in Table C-1 (Appendix C), an overview of their qualifications is available in Table C-2 (Appendix C) and their bios are available in Appendix D.

## **DATA COLLECTION**

Several different kinds of data and data collection instruments were used to complete this study and are detailed in Exhibit 4.2. Corporate Social Responsibility

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<sup>22</sup> A pilot study was conducted to test the Delphi process and first round interview format. Each of the pilot study participants has represented at least two of the stakeholder groups during their career; they offered feedback that helped develop both the process and the extended Delphi expert panel.

(CSR) statements and other policy documents were collected from company websites prior to the Delphi interviews as part of the expert panelist selection process.

| <b>Data Collected And<br/>Associated Data Collection Instruments</b>            |   |
|---|---|
| <i><b>Data Collected</b></i>  | <i><b>Data Collection Instruments Used</b></i>  |
| Understanding the concepts of sustainability and sustainable real estate        | Delphi Method – round 1 & 2 expert interviews   |
| Understanding how these concepts have been integrated into the decision process | Delphi Method – round 1 & 2 expert interviews; administrative documents                       |
| Criteria used for making sustainable real estate decisions                      | Delphi Method – round 1 expert interviews & round 3 e-questionnaire; administrative documents |
| Indicators used for assessing sustainable real estate                           | Delphi Method – round 1 expert interviews & round 3 e-questionnaire; administrative documents |
| Corporate Social Responsibility and sustainability motivations                  | Delphi Method – round 1 & 2 expert interviews; administrative documents                       |
| Related benchmarking criteria   | Documents (LEED, BREEAM) available online   |
| Decision-making process   | Delphi Method – round 1 & 2 expert interviews   |
| Demographics of experts   | Pre-interview questionnaire   |

Exhibit 4.2: Types of Data Collected and Data Collection Instruments Used During the Delphi Process.

In addition, administrative documents relating to the strategic decision-making process for sustainable real estate, lists or checklists of the criteria and indicators used to inform decision-making and assessment of sustainable real estate were requested from panel participants during the interviews. Interestingly, most firms would not share

specific information about the criteria and indicators they used to make decisions about sustainability issues with the researcher as many claimed that they were proprietary. When asked why this was the case, the unanimous answer was that the information was developed based on in-house research. One panelist candidly commented that “We have spent years researching and developing our strategy for integrating sustainability considerations into our strategic decision-making process for real estate. It is what sets us apart. Why should we share that with others who have not made that investment and willingly level the playing field – particularly when the market is so tight in this economy?”

### **Data Collection: The Modified Delphi Method**

#### ***The Modified Delphi Method - Round One: In-Depth Interviews***

For this research study, a modified version of the conventional Delphi Method was used. Linstone and Turoff summarized both the objective of the Delphi Method and the technique, “Delphi may be characterised as a method for structuring a group communication process, so that the process is effective in allowing a group of individuals, as a whole, to deal with complex problems” (1975: 3). This method is appropriate for this research because its structure allowed for a quasi-anonymous communication among the expert panelists that enabled the group to deal with the complexity of the concepts of sustainability and sustainable real estate.

As discussed in Chapter Three, the conventional Delphi method uses a series of surveys/e-questionnaires. This study has modified the conventional Delphi method; in place of the first round survey, the fourteen experts were interviewed. This allowed the researcher to gain a deeper, richer insight into the experts' understanding of the concepts, as well as how they applied those concepts in the decision-making process. The interviews were conducted so that each interview followed the same interview protocol and each used semi-structured interviews with open-ended questions based on Seidman's interview format (2006). One modification was made to Seidman's format. Rather than being done over three separate interviews, the life history, experience and reflection interviews were condensed into a one to two hour interview due to limited availability of the experts on the panel. The questions used in the phone interviews (see Appendix D) were tested and refined during a pilot study with five real estate experts – each with a broad understanding of the decision-making criteria used in real estate and with expertise that spans the multiple stakeholder groups being investigated. Using the feedback from the pilot study, the Institutional Review Board (IRB) application was submitted and obtained for the research.

In applying the phenomenographic approach, it required that the interviews were carried out as a dialogue to facilitate the thematization of aspects of the experts' experiences which had not previously been thematized. The ways of understandings were jointly created by the interviewer and the expert panelist; therefore, they were not there prior to the interview, ready to be "read off" as a question, nor were they only situational social constructions created during the interview process. The identified ways

of understanding were the aspects of the panelists' awareness that changed from being unreflected to being reflected (Marton, 1994) during the process of the interview.

To help facilitate this increase in awareness and understanding, the interviews used the Seidman's open/semi-structured interview format with only a few questions created in advance (see Appendix D). Most questions were developed in response to the expert's response to the previous question. Starting questions were aimed directly at the general phenomenon of interest (Marton, 1994) and were used to bring the conversation back on topic. For example, after some introductory discussion the interviewer asked, "What does the concept of sustainability mean to you?" Sometimes, to assist the panelist in developing clarity, the interviewer asked the subject to identify examples of the general phenomenon (ibid), for example by asking, "Can you give me an example of how the concept of sustainability differs from the concept of sustainable real estate?" Thereafter, the interviewer asked how the general phenomenon was applied in practice, for example by asking, "Can you describe how sustainability-related issues are being integrated into your real estate sector?"

In this study, the interviews began with a starting question that helped to understand the participants' understanding of the concept of sustainability, in general, and sustainable real estate, more specifically. From there, the interviewer guided the interviewee into a discussion of how these concepts are integrated into decision-making related to sustainable real estate investment/occupancy/development, the sustainability criteria and indicators currently being used by the stakeholder to assist in making these decisions and how these concepts are integrated into the decision-making/strategic

planning process of each of the stakeholder groups. The penultimate goal of the interviews was to better understand each stakeholder's way of understanding the concepts of sustainability and sustainable real estate, what criteria and indicators they associate with sustainability and sustainable real estate, how they use those criteria and indicators to make decisions about real estate and how those decisions are integrated into the broader strategic planning and decision-making process.

All interviews were digitally recorded and transcribed verbatim. File names were generalized so that the content of the transcribed interviews could not be directly tied back to the panelists. In addition, references to the name of the expert and/or the company they were representing were replaced with a code in the interview transcriptions. This ensured that the researcher was able to identify the information and link the information with each respondent, but other expert panelists and readers of the research results would not be able to do so. At the beginning of each interview, and again at the end, it was emphasized that all information would remain anonymous and no comments they made would be directly linked to the respondent or their company. By taking this precaution, it was hoped that the panelists felt free to share more in-depth information with the interviewer.

### ***The Delphi Method - Rounds Two and Three***

The second round consisted of follow-up phone interviews related to specific topics that had emerged during round one in-depth interviews. Due to limited time



availability or travel schedule, round two was done via email communication with some of the expert panel members. For the purposes of vetting the data, the second round began by offering each panelist a summary of the observations from the first round interviews; this gave experts an opportunity to clarify comments they perceived to be from their own first round interviews. Second round interactions also enabled the researcher to ask questions regarding topics which had emerged during some interviews but not in others, as well as to clarify statements from the panelists that the interviewer felt were unclear after re-reading the completed interview transcriptions. As a result, the second round communication varied from panelist to panelist. All fourteen panelists participated in the second round.

The third round utilized an e-questionnaire distributed using Survey Monkey (see Appendix E), following a similar process to that outlined for the conventional Delphi Method in chapter three. The e-questionnaire synthesized the information gathered from the inductive, qualitative approach used to analyze the content both of the literature and the LEED/BREEAM criteria, as well as the abductive approach used to create the data from the Delphi interviews. The third round enabled the researcher to understand the relative importance of the criteria and indicators, as well as which drivers were most influential in motivating the industry toward integrating sustainability initiatives. Panelists were sent an invitation to participate in the third round utilizing the e-mail option in Survey Monkey. This was followed up with an email invitation from the interviewer's personal email account so that panelists would be aware that the invitation was coming from Survey Monkey. After one week a reminder email was sent, again

utilizing both email methods. After two weeks, a third and final email was sent from the interviewer's personal account that included an embedded web link to the e-questionnaire. Twelve of the panelists participated in the third round e-questionnaire; however, only nine of the e-questionnaires were fully completed.

### ***The Delphi Method – The Delphi Report***

The Delphi Report, which pulled all the data together, was created and circulated to the experts after the third round. All panelists had an opportunity to respond to the report by further clarifying a statement they perceived to have come from their interview, suggesting additions to the content, responding to the consolidated data and/or conclusions (either through agreement or disagreement). After reviewing and integrating panelists' feedback, the final Delphi Report was vetted by the group. The collected interviews and questionnaire responses constitute the data which is analyzed in chapter five.

## **DATA ANALYSIS**

As discussed in Chapter Three, a phenomenographic approach was used in the data analysis. After the interviews were transcribed verbatim, the experts' preconceived ideas and understanding of the phenomenon of interest were bracketed in the transcription. The phenomenographic approach acknowledges that some participants express more than a single way of understanding the phenomenon (e.g. sustainable real

estate). Therefore, the unit of analysis is no longer the individual being interviewed or the individually transcribed interviews. Instead, consideration was given to all the transcripts from *all* the participants. An important thing to remember during the analysis stage is that:

[T]he different steps in the phenomenographic analysis have to be taken interactively. As each consecutive step has implications not only for the steps that follow but also for the steps that precede it, the analysis has to go through several runs in which the different steps are considered to some extent simultaneously” (Martin, 1994: 4427).

Rather than judging the extent to which individual responses reflect an understanding of the sustainability and/or sustainable real estate concepts, or how similar the respondent’s perceptions are to the interviewer’s, similarities and differences were identified among the expert participants’ understanding of the concepts (Marton, 1994) of sustainability and sustainable real estate as well as how the concepts are integrated into the strategic decision-making and planning process. The transcripts were considered collectively, and together they create the extensive and undivided data set – which was synthesized and reported back to the respondents via the Final Delphi Report.

The first step in reducing the amount of data for analysis was to highlight the information related to understanding the phenomenon and to exclude information that had nothing to do with sustainability or sustainable real estate. The second step in data reduction was to “identify distinct ways of understanding the phenomenon” (Marton, 1994: 4428). For this step, the data was categorized first based on similarities of

understanding the phenomenon and then themes were created based on the differences to capture the ‘contrast effect’.

The ways of understanding the phenomena were identified and grouped in two ways. First, the data was run through MaxQDA software<sup>23</sup> to identify themes in the text. MaxQDA readily allows for the comparison of understanding of the phenomena, as well as linking ways of understanding with specific comments. Second, excerpts from the transcripts were literally placed in piles as the different ways of understanding the phenomenon (e.g. sustainability) were identified. During this stage of the analysis, the focus was on the relationships between the expressions (quotes). It was extremely important during this stage of analysis to strive for a deep understanding of not only what had been said in the interviews, but what the interviewee meant.

The various statements have to be seen in relation to two contexts. One of the contexts is ‘the pool of meanings’ that emerged from what all the participants said about the same thing. The other context – here we reintroduce individual boundaries – is what the same person said about other things. The second context “is the hermeneutic element of the phenomenographic analysis” (Martin, 1994: 4428).

After the relevant data (quotes) have been grouped, the focus shifted away from the relationships between the data and onto the relationship between the stakeholder groups. Critical attributes and distinguishing features were identified, resulting in a set of descriptive categories from which the characteristics of the variation of understandings

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<sup>23</sup> More information about MaxQDA and MaxQDAplus can found on the website at: [www.maxqda.com](http://www.maxqda.com). The website offers an overview of its features, video tutorials, and a free 30-day trial for researcher interested in testing whether the software might be a useful tool in their research.

(of the phenomenon) were created. Marton (1981, 1994) refers to the ordered complex of descriptive categories as 'outcome space'. Once the categories of description and outcome space were identified, they were reapplied to the original dataset and determinations were made for each individual piece of data as to which descriptive category was appropriate. Within the outcome space there is a hierarchy among the categories of description. For the last step of this research stage, a distribution of frequencies for the descriptive categories was run to aid in communicating the results of the analysis and diagramming the hierarchy of the outcome space. Identifying these descriptive categories and creating the 'outcome space' are the primary result of this stage of the research and are discussed in more detail in the following chapter.

### **Triangulation of the Results: Word Frequency Analysis**

A word frequency analysis was conducted on the Delphi interview transcripts to quantitatively evaluate whether the results from the Delphi process were reasonable. All the interviews were selected and consolidated in to a single dataset in MaxQDA, and the word frequency tool was run. Four iterative rounds of analysis were completed. The first round eliminated non-research-related words (including all articles, prepositions and pronouns). The second round looked up words in their original interview contexts that were on the reduced word list and not clearly distinguishable as research or non-research related, then eliminated words that were determined to be non-research-related. The third round review removed non-specific action words (e.g. know, think, talk), analyzed the lists of words and created a set of preliminary categories of description/themes. The list

of words was read through several more times and the themes were revised to more accurately reflect the different categories represented in the reduced word list. The fourth and final round of analysis again reviewed the word list and eliminated all non-categorized words (including the 'other' category which included words such as time, industry, types). Some action words were moved back into the list because they were clearly identifiable with a research-related action. A word frequency visualization diagram was created to graphically illustrate which words had been used most frequently during the interviews. Lastly, all the categorized words and word frequencies were grouped by stakeholder group and comparisons were then made to the results from the Delphi process.

### ***Use of Qualitative Data Analysis Software (MaxQDA) in the Dissertation***

MaxQDA is a qualitative data analysis (QDA) software developed in Germany for data management, theory development, and testing of theoretical conclusions. The software has been used by researchers in many fields (such as sociology, economics and urban design, among others) to assist in the coding and analysis of qualitative data. In real estate research, MaxQDA has been most commonly used by European academics in Germany, Switzerland and the Netherlands. MaxQDA allows the researcher to import text files in many formats and create a complete data set from multiple sources. Files can be activated and separated to be analyzed individually, or activated and combined into data sets that allow for multiple files to be merged and analyzed together. Code (or category) systems are easily created and can be moved around using a drag and drop

function, or copied and pasted as sub-codes of higher level codes. Hierarchies can be created with up to ten levels of coding, and weight scores assigned by the researcher allow the researcher to distinguish between the importance of coded segments on a scale of 0-100; the value is then displayed with the coded segment whenever it is activated.

Codes can either be pre-set and applied using a drag and drop feature, or, codes can be created as the researcher is reading the text (called in-vivo coding). This research study utilized the in-vivo coding ability as part of the iterative, phenomenographic approach to data analysis. After each round of analysis, the codes were activated individually to ensure that each text segment had been appropriately coded. If a text segment needed to be re-coded, if it was decided that a text segment needed multiple codes, or if portions a text segment needed an additional code to overlap with another coded text segment these changes are quick and easy to make using the software. Sometimes it was necessary to review text segments in their original context to ensure that it had been appropriately coded. In addition, individual documents were examined for correlation of code existence and frequency using the intercoder agreement tool and, where necessary, adjustments were made to text segments that were flagged as possibly being improperly coded.

MaxDictio is an add-on module in MaxQDAplus and was used for content analysis and visualizations of the transcribed interviews. These analytical tools, as well as options to compare documents and develop code lines and matrices, enable the researcher to quickly gain an overview of qualitative data and can help inform the development of categories of description (themes) which are in turn represented by the

codes used in the analysis. The word frequency analysis on the interview transcripts in this research utilized the MaxDictio application as well as the word cloud application, which develops graphic representations of the word frequencies (see Exhibit 5.12).

## **COUNTERING THREATS TO THE SOUNDNESS OF THE RESEARCH**

### **Credibility**

Threats to credibility were countered through the use of multiple confidential interviews in the multiple-case case study design. The format of the Delphi interviews enables people to respond to the merit of the information rather than where or who it is coming from and it removes the ‘stakeholder’ from the information. Since interviewees were not randomly selected, potential selection biases were countered by collecting demographic information from the participants to see if they influenced the responses in any way. This data was also used to qualify the panelists as experts.

Because only the panelists themselves can assess the credibility of results, the use of the Delphi Method assures credibility in that it is an iterative process that constantly allows for participant feedback. The Delphi Report was circulated to all expert interviewees for review and comments from the panelists were incorporated into the report. The final report was then re-circulated to the panelists – this process is all part of the Delphi Method as described above. In this way, panelists vet the data via the Delphi Report, ensuring credibility.



## **Transferability**

Threats to transferability were addressed by clearly explaining the conceptual framework for the research (Chapter Three) and by identifying important contextual issues related to the research (e.g. how experts were chosen or the stakeholder groups they represent). In addition, all administrative documents obtained from websites or from experts were archived so that they are “readily retrievable for later inspection or perusal” (Yin, 2009: 120).

## **Dependability**

Because a prescriptive format has yet to be formally established for the phenomenographic approach, the specific steps for the phenomenographic approach employed for both the data collection and analysis were described in detail above. Each interview transcription was read several times before the coding of the data began. Categories of description emerged for each of the phenomena being evaluated through an iterative process that included multiple coding sessions.

An ‘Audit Journal’ (Maxwell, 2005) was kept to track decision-making rationale with regards to additional interview questions that arose during the interview process, to keep the “open-ended answers to the questions in the interview protocol” (Yin, 2009: 121) and to account for changes in the context of the research. The Audit Journal acted as a means of maintaining a chain of evidence so that others may trace the steps of the research from the initial research questions to the final conclusions based on the evidence

(Maxwell, 2005). This helps others to track the rationale for research design and methods decisions as well as conclusions drawn throughout various stages of the research. Therefore, the audit journal also assists in overcoming threats to transferability and confirmability.

With regards to the transferability and dependability of the descriptive categories and outcome space, it should be kept in mind that analysis in the phenomenographic approach is not a measurement, but rather a process of discovery. Marton notes that the “discovery does not have to be replicable, but once the outcome space of a phenomenon has been revealed, it should be communicated in such a way that other researchers could recognize instances of the different way of experiencing [understanding/perceiving] the phenomenon in question” (1994: 4429). In other words, the results need to communicate in such a way that another researcher can look at the dataset and be able to identify which of the descriptive categories applies to each individual phenomenon. There should be a “reasonable degree of agreement” between two independent researchers – this is identified as being in agreement for 2/3 of the cases and coming to agreement after discussion for 2/3 of the remaining cases (ibid). As such, the phenomenographic approach directly addresses the issues of transferability and dependability.

### **Confirmability**

Multiple sources of evidence will serve as a data triangulation method and address potential problems with construct validity because the expert sources “essentially provide

multiple measures of the same phenomenon” (Yin, 2009: 116). The Delphi Method process was used for the expert interviews; this allows multiple expert sources to ‘build’ the data set (of ‘green’ asset decision-making criteria). In addition, the information gained in each expert interview was compared with the secondary data (company CSR statements and other administrative and policy documents) to further build the data set and determine the level of correlation between the guiding principles of the experts (through the company/corporation they represent) versus the perceived decision-making processes and industry best practices revealed in the interviews. In this way, the research addresses the threats to confirmability.

## **DEVELOPMENT AND TESTING OF THE INDUSTRY SURVEY INSTRUMENT**

The last stage of the research was the development and testing of an industry survey tool that will be used in future research. Survey questions were pilot tested as part of the third round of the Delphi Method, and modifications were made based on feedback from the experts. The purpose of the industry survey will be to gain quantitative feedback on how the industry at large understands the concepts of ‘sustainability’ and ‘sustainable real estate’, the criteria and indicators used to make decisions about and to assess sustainable real estate, and how industry practitioners are integrating sustainability initiatives into their strategic planning and decision-making process. The results will also enable the researcher to identify gaps between industry leaders (represented by the Delphi panelists) and the industry at large with regard to the understanding of these concepts and

their integration of sustainability issues in the strategic planning and decision-making process.

The survey will be an e-mail questionnaire and will be distributed to representatives of the different stakeholder groups as detailed in the section below. As previously mentioned, the survey questions were pre-tested with the participants of the Delphi interviews as part of the round three e-questionnaire (as they were familiar with both the sampling frame populations and the purpose of the research) to evaluate the length, format and wording of the e-questionnaire - as suggested by Dillman, Smyth and Christian (2008). In addition, the revised survey was pilot tested via a distribution to members of two real estate organizations, Lambda Alpha International (LAI) and the Counselors of Real Estate (CRE). Based on feedback from the second pilot study, which included 60 survey respondents, the survey instrument has been further refined and is ready to be used in the next phase of the research (the analysis of the survey results is outside the purview of this research).

CHAPTER FIVE  
RESEARCH RESULTS: UNDERSTANDING SUSTAINABLE REAL ESTATE  
FROM THE INDUSTRY PERSPECTIVE

**OVERVIEW OF THE RESULTS**

This chapter discusses the results from the Delphi study. The first section directly answers the first three research questions. First, outcome space diagrams of the different ways of understanding the concepts (i.e. the categories of description) of ‘sustainability’ and ‘sustainable real estate’ are explained. This is followed by the outcome space diagram and explanation of the four approaches to integrating sustainability into the strategic decision-making and planning process for real estate. Each outcome space diagram is followed by explanations of the individual categories of description (i.e. the ways of understanding the concept) that make up the outcome space. As prescribed by the phenomenographic approach, the outcome space diagrams graphically illustrate the different ways of understanding and the hierarchy of their inter-relationships. The outcomes space hierarchy is explained in more detail below.

The second section delves into the secondary questions related to the strategies used to integrate sustainability concerns into the decision-making and planning process for real estate. Using the results from the Delphi third round e-questionnaire, this section summarizes the results of the combined responses and then discusses the following topics from the perspective of each of the real estate stakeholder groups: the degree to which sustainability concerns are integrated in the strategic decision-making and planning

process, the primary drivers (i.e. motivations) for pursuing the integration of sustainability initiatives, the criteria used to make sustainable real estate decisions, the key performance indicators used for sustainable real estate assessment, and the function of the sustainability criteria and indicators in the strategic decision-making and planning process (i.e. how are they used and for what purpose). Similarities between the stakeholders are highlighted and key divergences between the stakeholder groups' responses are discussed.

The third section reviews the results of the word frequency analysis. The word frequency analysis consolidated all the individual transcripts into a single file and looked at the frequencies of each word used in the interviews to tease out the themes/topics of conversation that interviewees spent most time discussing. The themes were then compared with the results from the phenomenographic analysis of the Delphi interview to see how they compared as strategy to test whether the Delphi results were reasonable.

Lastly, a series of 'lessons learned' offer real estate industry practitioners an overview of the key insights gleaned from the results of the data analysis. Quick overviews of the most important sustainability drivers, criteria and indicators are provided. Important convergences and divergences between the stakeholder groups are highlighted and potential impacts of the divergences on the industry are identified.

## **Research Questions**

- What does the concept ‘sustainability’ mean to each of the stakeholder groups? How is the concept ‘sustainability’ understood by the different stakeholders?
- What does the concept ‘sustainable real estate’ mean to each of the stakeholder groups? How is the concept ‘sustainable real estate’ understood by the different stakeholders?
- How do the stakeholder groups apply their understanding of the concepts ‘sustainability’ and ‘sustainable real estate’ (i.e. how do stakeholders integrate sustainability related issues in the decision-making/strategic planning process related to commercial real estate)?
  - What are the criteria used to make decisions about ‘sustainable real estate’ by each of the different stakeholder groups?
  - What are the indicators used to assess ‘sustainability’ by each of the different stakeholder groups?
  - How/why do these criteria and indicators inform the decision-making process differently depending on the role of the stakeholder in the real estate process?
  - What are the barriers to making sustainable real estate criteria and indicators more transparent and more easily comparable?

## **OUTCOME SPACES: THE DIFFERENT WAYS OF UNDERSTANDING**

As noted in the Chapter Four, the results of the phenomenographic analysis are the categories of description and the outcome space diagram. For the last step of the analysis, the internal relationships between the categories of description developed in response to each research question were examined, and a hierarchy was created for each outcome space. The hierarchy was then diagrammed to graphically illustrate the relationships. The vertical bars of the outcome space diagram represent the factors

considered within the categories of description (i.e. the ways of understanding). The size (i.e. height) of these factors is not indicative of their importance, but rather whether they were included or excluded from each of the categories of description. The horizontal bars represent the categories of description that were developed from the consolidated Delphi interviews and span the factors that were considered in each of the ways of understanding the concepts of ‘sustainability’ and ‘sustainable real estate’. Their length (by default higher level in the hierarchy) represent their inclusiveness of the factors, but not necessarily the equal emphasis on each factor. Higher level on the hierarchy also does not indicate that the category of description was represented by experts more frequently as their way of understanding the concepts, but rather that the category of description considers more sustainability factors than those lower in the hierarchy.

### **The Concept of ‘Sustainability’ – What Does it Mean and How is it Understood?**

In the analysis of the fourteen interviews with real estate industry experts, five categories of description were identified to represent the different ways of understanding the concept of ‘sustainability’ by the different real estate stakeholders. To each of these a metaphor was assigned to capture the essence of that way of understanding the concept of sustainability. The five different categories of description are: (a) the *Environmental*ist, who focuses primarily on the environmental aspects; (b) *the Practical Ecologist*, who believes in integrating environmental concerns as long as there is no negative impact on the bottom-line; (c) the *Brundtland ‘3E’ follower*, who equally considers the social equity, environmental and economic factors; (d) *the Economist*, who recognizes the ‘3E’s



of Brundtland’s definition but emphasizes that economic value and feasibility must first be present before socially and environmentally-focused actions can be undertaken; and (e) the *Global Steward*, who believes there is a moral imperative to get involved with doing the ‘right thing’ for the planet, the people on the planet, and the economy – for today’s generation as well as for future generations.

The outcome space diagram for the concept of ‘sustainability’ (see Exhibit 5.1) illustrates the hierarchy among the categories of description. At the bottom of the hierarchy, the *Environmental* way of understanding the concept includes only one of the sustainability factors identified by the Delphi panelists, the environmental factor. At the top of the hierarchy, the *Global Steward* include all of the sustainability factors



Exhibit 5.1: Outcome Space Diagram for the Concept of ‘Sustainability’. The diagram represents the hierarchical relationships among the collective ways of understanding the concept of ‘sustainability’.

identified by the panelists - environmental, social, economic and governance - as well as a fifth factor, moral imperative. Each of the categories of description is detailed below.

***(a) The Environmentalist***

Focus is on global warming, climate chaos and/or environmental preservation/conservation issues. Those that understand sustainability from this perspective are primarily concerned with the environmental impact that our actions have and place less importance on the economic feasibility of changing our actions or the social implications of particular environmental actions. In the literature<sup>24</sup>, this group might be categorized as

**Strong Sustainability Model**

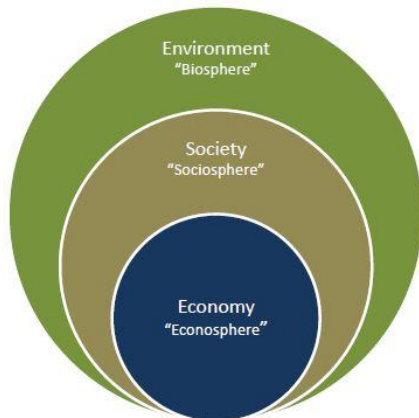


Exhibit 5.2: Strong Sustainability Model

emphasizing ‘strong’ or ‘moderately strong’ sustainability. This concept is based in the belief that the Earth has finite resources (the ‘biosphere’) and that all activities occur within the boundaries of the biosphere limits, including all societal and economic functions (Exhibit 5.2). A distinction must be made at this point between ‘strong’ and ‘moderately strong’ sustainability. Although the sustainability model in Exhibit 5.2

captures the hierarchy structure of both the strong and moderately strong ways of understanding sustainability, individuals that support the strong sustainability way of

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<sup>24</sup> Williams and Millington (2004) offer an overview of the environmental paradox as well as strong, moderate and weak sustainability viewpoints.

understanding sustainability would advocate for preservation of the integrity of all environmental systems in the biosphere and specifically point out that irreplaceable natural capital cannot be replaced by human-made capital (Bartelmus, 2013; Dresner, 2009). In contrast, individuals that support the moderately strong sustainability allow for human-made capital substitutions when the depletion of natural capital is directly compensated for by an equivalent increase in another kind of capital – e.g. oil may be taken from the planet only if the revenues are used for the development of alternative energy sources/technology, such as solar energy technology (ibid).

None of the experts on the panel fell within the strong or moderately strong way of understanding sustainability; however, several described this way of understanding the concept of sustainability as representative of the general viewpoint of some colleagues in the broader real estate community. Some expert panel members surmised that perhaps this ‘narrow’ understanding of the concept of sustainability is one of the reasons that some members of the real estate community have yet to ‘jump on the bandwagon’. Experts suggested that members of the real estate community that hold this understanding of sustainability believe that sustainability issues are not ‘business-related’, but rather that sustainability is something that ‘ultra-liberal’ or ‘tree-hugger’ sympathizers are concerned with. Therefore, real estate community members with this understanding of the concept of ‘sustainability’ have made little effort to understand the complexities of inter-connected issues that are associated with the concept of sustainability or the potential positive impacts sustainability can have on the real estate industry (improved value, reputation and employee satisfaction for example).

***(b) The Practical Ecologist***

The second way of understanding the concept of sustainability is also within the framework of environmentalism. However, this group takes a slightly less rigid viewpoint and includes the practical stance that environmental actions must also be economically feasible. Again, none of the panel participants represented this as their personal understanding of sustainability, nor that this was the viewpoint embraced by their organization. However, several of the panelists suggested that talking about sustainability in this way might be the ‘gateway’ to talking with naysayers about sustainability. Panelists speculated that, once skeptics were engaged in a discussion about sustainability, as understood by the *Practical Ecologist*, the long-term goal of broadening their understanding of sustainability to also include consideration of the social and governance factors would be more likely. The perception of the experts was that many opponents of integrating sustainability concerns into the commercial real estate decision-making and strategic planning process believe that sustainability is not a business issue; however, by discussing environmental issues within the context of economic feasibility they felt it might be possible to persuade some of the naysayers to consider at least the ‘low-hanging fruit’ - green elements that require minimal effort and have little to no negative financial impact, such as recycling.

**(c) Brundtland ‘3E’ Follower**

This way of understanding emphasizes that the environmental, social and economic factors are equal, and many experts made specific reference to the *Brundtland* definition of sustainability. Across all the stakeholder groups, the *Brundtland ‘3E’ Follower* was the most common way of understanding sustainability.

Some of the experts who talked about sustainability in this way also included governance factors in their understanding of the concept of sustainability (and some panelists specifically referenced the ESG components of the *UN Principles for Responsible Investment*). Respondents who also considered governance factors are included in this category if they believed

that each of the factors should be equally weighted. Ultimately, the distinguishing characteristic of this way of understanding is *balance*, as graphically illustrated in Exhibit 5.3. That is, balance in consideration of the environmental, social, economic and, in



Exhibit 5.3: The Balance of Sustainability Factors as Understood by the Brundtland ‘3E’ Follower.

some cases, governance factors. As one panelist succinctly summarized, “We strive to appropriately balance economic, environmental and social considerations throughout the decision-making and management process.”

**(d) The Economist**

Expert panelists with this way of understanding the concept of ‘sustainability’ associated the concept with the *United Nations Principles for Responsible Investment*; as a result, the *Economist* includes consideration of environmental, social, economic and governance factors. Similar to the *Practical Ecologist*, panelists expressing this way of understanding also associated the concept of ‘sustainability’ within a framework of environmental and ecological economics. A differentiating element of the *Economist* is that this way of understanding places economic value (both the use-value and the non-use-value) as the central and most important factor. Economic value is the overarching

consideration even though other factors, such as environmental amenities and resources, social equity and governance factors associated with the concept of sustainability, are considered. The model representing this viewpoint is sometimes called the Mickey Mouse Model – with the larger circle of the economic factor representing Mickey’s face, and the smaller circles of the environmental and social factors representing his ears. To best represent the *Economist* way of

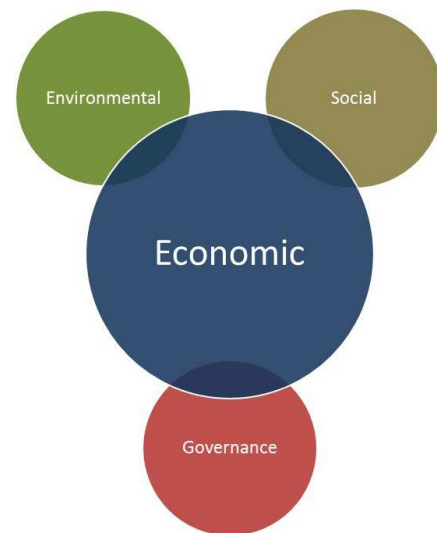


Exhibit 5.4: Modified Mickey Mouse Model of Sustainability

understanding the concept of ‘sustainability’, the conventional Mickey Mouse Model has been modified to include another smaller circle for consideration of governance factors, representing the center of Mickey’s bowtie (see Exhibit 5.4).

The annual sustainability report found on the company website of one of the expert panelists defined sustainability as:

[E]conomic development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs...this goal directly aligns with our commitment to continuously seek improvement in the environmental performance...across a broad a variety of value drivers.

Note that the emphasis is on ‘economic’ development. Although the scope of this way of understanding the concept of sustainability is broader than that of the *Practical Ecologists*, they share a belief that economic feasibility is of central importance to the concept of sustainability. As one panelist noted:

...when you properly manage a portfolio responsibly, it enhances [financial] performance. Then it becomes the fiduciary duty of the fund manager to do it [sustainability] - because it is in the best interest of their client(s).

In the literature, this way of understanding is sometimes referred to as ‘weak sustainability’. Dresner notes that the “weak sustainability rule is ‘non-declining total capital’...[that] allows human-made capital to substitute for natural capital” (2009: 82). Bartelmus agrees with this and further elaborates that “weak sustainability assumes that other production factors can, if necessary, replace the capital goods used up in production and income generation. Production capital, in particular, should substitute for natural (non-produced and exhaustible) capital [and] thus ignores the existence of possibly irreplaceable ‘critical’ natural capital” (2013: 65-66).

***(e) Global Steward***

The *Global Steward's* understanding of the concept of sustainability is expanded beyond the triple bottom line perception represented in the *Brundtland '3E' Follower* and the *Economist* ways of understanding. These two categories express the understanding of the concept of sustainability solely within the context of the business environment. A *Global Steward*, on the other hand, view the economic factor more broadly; economic impact is considered beyond immediate triple bottom-line impacts and is instead considered in terms of its economic impact on the extended community. Like the *Brundtland '3E' Follower*, this way of understanding emphasizes a balanced inclusion of environmental, social, economic and governance factors. The differentiating characteristic of the *Global Steward* is that they believe these factors must be considered, because it is our moral imperative as stewards of the earth – ‘the right thing to do’. In other words, as one panelist eloquently phrased it, there are some sustainability initiatives that, regardless of whether it “affects performance negatively or positively...there’s a moral inheritance to do it [sustainability initiatives].”

None of the experts on the panel fully embraced this way of understanding the concept of sustainability, although several did discuss this way of understanding. Although this group of panelists from a moral and ethical perspective wanted to embrace this version of the concept of sustainability, all the panelists who discussed this way of understanding ultimately brought the discussion back around to the economic factor and noted that at this time there are too many barriers to realistically pursue sustainability in this manner. For this reason, this way of understanding is included as an ideal – but non-



implemented – way of understanding the concept of sustainability. Most of the panelists who talked about this understanding of the concept of sustainability dealt with space occupancy issues, and all of them had fully integrated CSR goals in their annual company reports (retrieved off their websites).

### **The Concept of ‘Sustainable Real Estate’ - What Does it Mean and How is it Understood?**

In the analysis of the fourteen interviews conducted with real estate industry experts, four ways of understanding the concept of ‘sustainable real estate’ were discovered. As with the concept of sustainability, a metaphor was assigned to capture the essence of that way of understanding the concept of sustainable real estate’. The four categories of description are: (a) the *Environmental Economics Approach*, which is concerned with environmental concerns - as long as there is no negative economic impact on the bottom-line; (b) the *Brundtland Approach*, which balances consideration for the social equity, environmental and economic factors associated with real estate; (c) the *ESG/RPI Approach*, which emphasizes the importance of economic value and feasibility as the primary factors, identifies corporate governance issues as a means to structure sustainability efforts and considers the impact of social and environmental focused action; and (d) the *Global Stewardship Approach*, which emphasizes that there is a moral imperative to take a holistic, integrated approach to addressing the environmental justice, social equity and economic stability impacts of commercial real estate.

The outcome space diagram for the concept of ‘sustainable real estate’ (Exhibit 5.5) illustrates the hierarchy among the categories of description. At the bottom of the hierarchy, *Environmental Economist Approach* includes only two of the sustainability factors identified by the Delphi panelists, the economic and environmental factors. At the top of the hierarchy, *Global Stewardship* includes all of the sustainability factors identified by the panelists - environmental, social, economic and governance - as well as a fifth factor, moral imperative. Each of the categories of description is detailed below.



Exhibit 5.5: Outcome Space Diagram for the Concept of ‘Sustainable Real Estate’. A hierarchical diagram representing the collective ways of understanding the concept of ‘sustainable real estate’ within the real estate community.

***(a) Environmental Economics Approach***

As with *the pragmatic ecologist* perspective listed in the outcome space for the concept of ‘sustainability’, this way of understanding the concept of ‘sustainable real estate’ includes consideration of environmental factors (specifically mentioned by experts were issues relating to the site management, energy and water usage, waste and emissions reduction and use of natural resources) and economic factors (specifically mentioned were issues such as pay-back period, valuation implications, cost and feasibility of implementing environmental sustainability actions). Panelists felt that this way of understanding how ‘sustainability’ can be integrated into real estate decision-making and the strategic planning process was prevalent within the real estate industry, in general, and was most common among the real estate development stakeholders. The most common assessment method for this approach is the achievement of a building assessment rating certificate, such as LEED or EnergyStar.

Although the Delphi panel participants did not themselves fall in this category, several indicated that they believe the majority of the larger real estate community understands the concept of ‘sustainable real estate’ in this way. Most panelists felt that many of these members of the real estate community primarily implement the ‘low-hanging fruit’ in an effort to achieve what they understand to be sustainable real estate. One example of ‘low-hanging fruit’ is the use of high-efficiency light bulbs in place of standard light bulbs. Although there is an upfront premium when purchasing high efficiency light bulbs, the premium is easily recouped over the lifetime of the bulb.

Sustainable real estate efforts that only implement ‘low-hanging fruit’ would be considered ‘green starters’ or ‘green talk’ (GRESB, 2012).<sup>25</sup> By implementing these often simple - and sometimes minimal impact - sustainability efforts, real estate industry members are able to report to their stakeholders that they are undertaking sustainability initiatives, thereby benefitting from positive public relations announcements despite the minimal impact those efforts might have. Although the panel emphasized that some real estate community members that have this understanding of the concept of ‘sustainable real estate’ are making significant environmental efforts, some that even have positive, regenerative impacts on the community and environment, they unanimously agreed that this is most often not the case as efforts to achieve this type of sustainable real estate more commonly have little to minimal tangible impact on the community and/or the environment. One panelist commented that some real estate community members with this way of understanding sustainable real estate are companies who are ‘green washing’ their efforts. In other words, they implement ‘low-hanging fruit’ sustainability initiatives solely for ‘green PR spin’ purposes.

***(b) Brundtland Approach***

As with the *Brundtland ‘3E’ Follower* perspective listed in the outcome space for the concept of sustainability, this way of understanding sustainable real estate includes

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<sup>25</sup> See *The 2012 GRESB Report* for a definition of green starters, green talk, green walk and green stars as well as a discussion of global trends related to these terms.

balanced consideration of the three core factors of sustainability: environmental, social and economic. Annual sustainability reports provided by two of the panelists stated:

We believe there are economic, environmental and social implications associated with the full range of our real estate investment management decisions, and that a commitment to decision-making that incorporates sustainable real estate best practices.

Each day, more people are coming to terms with the lifecycle impact of their decisions, and they are striking a balance between today's needs and the ability to meet tomorrow's.

The *Brundtland Approach* was frequently discussed by panelists in terms that align with the Triple-Bottom Line Model. Among the challenges faced by panelists with this understanding of the concept of sustainable real estate is the issue of how to account for sustainability initiatives for which there are impacts (positive and/or negative) on two or more sustainability factors; one example is how to capture the impact of the thermal comfort of occupants. As discussed in Chapter Two, there has been some recent evidence that indicates that occupant satisfaction (of which thermal comfort is one variable) leads to increased employee productivity and less sick days. Thermal comfort, therefore, captures a positive social impact – occupant satisfaction and improved health – that may also have a positive economic impact – increased productivity and its resulting revenue. Panelists felt that this interaction was difficult to capture in the triple-bottom line model and reporting structure. In addition, they commented that sustainability initiatives which enable synergistic interaction among the factors the most important characteristic of sustainable real estate. Panelist participants using the *Brundtland*

*Approach* to sustainable real estate were most apt to pursue the *Integrated Approach*, discussed as part of the outcome space below, when integrating sustainability in the real estate decision-making and strategic planning process. Expert panel members were equally split between the *Brundlandt Approach* and the *ESG/RPI Approach*, discussed as the next category of description.

Panel participants using the *Brundlandt Approach* to understanding the concept of ‘sustainable real estate’ also noted that the importance of achieving synergies between environmental, social and economic factors has also entered the current debate of how the building assessment rating systems should be evolving. Although LEED v4<sup>26</sup> is still far from being a balanced assessment system, as advocated by those using the *Brundtland Approach*, the new version of the assessment rating system is making strides to reward synergistic efforts and to address more social and economic factors. Two new categories – ‘integrative process’ and ‘locations and transportation’ – are indicative of this change. The ‘integrative process’ credit will reward participants who “beginning in pre-design and continuing throughout the design phases, identify and use opportunities to achieve synergies across disciplines and building systems” (USGBC, 2012). Credits have also been added to reward actions with positive social impacts, for example ‘access to quality transit’. In addition, new credits related to indoor environmental quality, such as ‘quality views’, ‘acoustic performance’ and ‘enhanced indoor air quality strategies’. There are also several performance credits that address the interplay between environmental and

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<sup>26</sup> The US Green Building Council (USGBC) has postponed the member ballot on LEED v4 until 2013. Some have indicated this is because member feedback has shown that v4 may be advocating for too much change too quickly. The draft is available for review on the USGBC website at: [new.usgbc.org/credits/new-construction/v4-draft](http://new.usgbc.org/credits/new-construction/v4-draft).

economic impacts (albeit tangentially) when using improved energy monitoring systems. One example is the new energy and atmosphere (EA) credit ‘demand response’, which is “intended to increase participation in demand response technologies and programs that make energy generation and distribution systems more efficient, increase grid reliability and reduce environmental impacts and greenhouse gas emissions” (ibid). Although LEED v4 will still be heavily weighted toward environmental stewardship issues related to sustainable real estate development and management, it is evident that there is an effort being made to become more balanced and to recognize both the linkages and the potential synergies between the environmental, social and economic factors of sustainable real estate.

***(c) The ESG/RPI Approach***

This way of understanding sustainable real estate includes consideration for all of the dimensions of sustainability: environmental, social, economic and governance factors. However, this way of understanding included a weighted significance to one of the factors, commonly either the environmental or the economic factor. Significance was expressed by panelists through terminology such as ‘environmental stewardship,’ ‘environmental sustainability,’ ‘energy management,’ ‘fiduciary duty’ and/or ‘fiduciary responsibility to clients’ (and/or stockholders). There were also frequent references to ‘corporate social responsibility’ and the *UN Principles for Responsible Investment*. The website for one of the organizations represented on the expert panel explains the approach concisely:

We hold ourselves accountable for the social, environmental and economic impact of our operations. We design our policies and business practices to reflect the highest standards of corporate governance, transparency and ethics. We support all aspects of the corporate social responsibility agenda, but one area is particularly relevant for us...

Panelists with this way of understanding the concept of ‘sustainable real estate’ most often pursued the *Integrated Approach*, discussed in the section below, and had fully developed CSR statements and reporting requirements. This way of understanding was expressed least among the developers, and was most common among real estate investors.

#### ***(d) Global Stewardship Approach***

As with the *Global Steward* perspective listed at the top of the outcome space for the concept of ‘sustainability’, at the core of the *Global Stewardship Approach* is a moral imperative to get involved with doing the ‘right thing’ for the planet’s environment, the people on the planet, and the economy of our communities, for today’s generation as well as for future generations. In the CSR statement for one company participating on the panel was the following pledge, “As part of our commitment to create real value in a world that is constantly changing, we are determined to be good corporate citizens in every corner of our global community.”

This approach was considered by many panelists as the ideal for how sustainable real estate could/should be undertaken. However, during the Delphi interviews all the panelists again acknowledged that, as with the concept of sustainability, there are too



many barriers for this approach to sustainable real estate to be a feasible way of doing business in today's business climate. As a result, even those companies who believe in this way of understanding have not yet been able to fully reach this ideal. Although moral imperative was discussed with regards to sustainable real estate during interviews with experts who held the *Brundtland Approach* and *ESG/RPI Approach* to understanding 'sustainable real estate', it was not the identifying characteristic or driver for pursuing sustainable real estate for these individuals; however, for the *Global Stewardship Approach* moral imperative is at the core.

### **How Are The Above Concepts Integrated Into Strategic Decision-Making?**

Among the panelists, there were four primary ways of integrating the concepts of 'sustainability' and 'sustainable real estate' into the strategic decision-making and planning process within the real estate community. Once again, a metaphor was assigned to capture the essence of that way of understanding integration as it relates to sustainable real estate. The four categories of description are: (a) the *Non-Believer*, who choose to NOT integrate sustainability issues into their decision-making and strategic planning process; (b) the *Test Approach*, which uses checklists to ensure actions meet internally created environmental, social, and economic requirements; (c) the *Tiered Approach*, which advocates for the use of different criteria and indicators at different tiers; and (d) the *Integrated Approach*, which takes a systems approach to integrating sustainability concerns into the decision-making/strategic planning process.

The outcome space diagram in Exhibit 5.6 illustrates the hierarchy among the categories of description. On the left, the *Non-Believers* stand alone because they are alone in not considering sustainability concerns in their strategic decision-making and planning process. In the middle, the *Test Approach* uses a checklist to ‘test’ whether sustainability targets have been met as part of their real estate decision-making process. The *Tiered-Approach* also utilizes ‘tests’ to ascertain whether their targets have been met, however, this approach recognizes that different sets of information are necessary to make decisions at different levels in the real estate process. On the right, the *Integrated Approach* includes consideration of sustainability concerns and the sustainability impact of all their decisions. Each of the categories of description is detailed below.

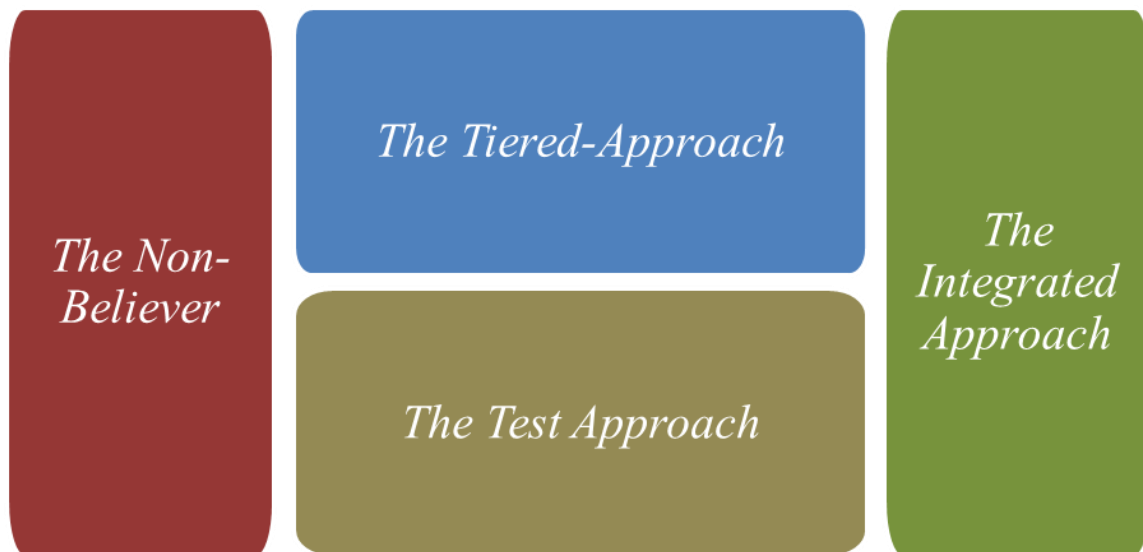


Exhibit 5.6: The Outcome Space Diagram of the Integration of Concepts in Commercial Real Estate. A hierarchical diagram representing the collective ways of understanding how the concepts of ‘sustainability’ and ‘sustainable real estate’ are integrated into strategic decision-making and planning within the commercial real estate community.

### ***The Non-Believer***

Although none of the panelists identified with this way of integrating sustainability concerns into real estate decision-making and strategic planning, the majority of panelists discussed the lack of integration of sustainability concerns as an approach held by many stakeholders in the real estate community. Some panelists felt that this (lack of) approach to sustainability by real estate community members was a result of either: (a) a lack of understanding about what sustainability is, and referenced the ‘faulty understanding’ of the *environmentalist* understanding of sustainability; (b) a lack of understanding about the potential benefits of undertaking sustainability initiatives, including improved return on investment, positive PR or image branding and/or increased employee/user satisfaction; (c) a lack of understanding about the real costs of undertaking sustainability initiatives, including the possibility to implement many sustainability activities with little to no increase in cost; or (d) not knowing how or where to start.

### ***The Test Approach***

For experts that utilize the *Test Approach*, sustainability is considered as one of many considerations in the strategic decision-making and planning process for sustainable real estate, rather than as a core element influencing decisions throughout the process. Decision-makers use either a checklist or a series of benchmarks to test whether a real estate investment, space occupancy decision, and/or development decision meets the immediate goals, CSR sustainability requirements and long-term strategic plan of the

organization. All of the panelists using this integration method were unable to share the specific checklists and/or benchmarks used for assessment and decision-making, stating that the information was ‘proprietary’. One participant candidly acknowledged that they had spent years investing in research to identify the best criteria and indicators to use for their sustainable real estate assessment purposes and admitted that they felt that their in-house developed checklist was something that gave them an advantage in the market because it enabled them to: “better understand and work with appropriate metrics and ultimately which projects are the projects that have payouts. Not necessarily a return on cost, but a return on investment from a market value perspective.”

Another panelist also talked about the hard work they put into translating all the complex facets which influence the sustainability of real estate into a series of key performance indicators that can be used to guide their decision-making process:

We’re looking for a fairly straightforward method of taking what we know in the field and translating it into a small handful of lead performance indicators that will direct us...towards making decisions about individual assets at the end of the day, first and foremost financially, but also the environmental and social objectives.

A third panelist straightforwardly asked what could be gained from them sharing the research and giving up what they felt was a clear market advantage. This expert felt that to share all their research with members of the broader real estate community who were just getting started with sustainability implementation – many of whom were originally skeptics and had therefore invested little to nothing in sustainable real estate

research – would be economically irresponsible and therefore not be economically sustainable for their organization over the long-term. Ultimately, the objections these panelists expressed can be attributed to the fact that how they make sustainability-related decisions is in their view no different than how they make other strategic business decisions related to real estate. In the end, the sustainability criteria and indicators developed to assist in the sustainable real estate decision-making and strategic planning process are unique (i.e. proprietary) to their organization and intended to give them an advantage in the marketplace.

In the context of the literature review, where the argument was made that the diversity of criteria and indicators being used is a barrier to market transparency and competition, the *Test Approach* offers an interesting alternative viewpoint. When asked directly whether the diversity of criteria and indicators being used is a barrier to creating transparency and competition in the growing sustainable real estate market, panelists with this perspective did acknowledge that there might be some truth in the argument. However, all but one made the counter-argument that it is less important that the exact same indicator be used for assessment and decision-making. Instead, they suggested that tracking key performance indicators (such as water, waste, recyclables, carbon emissions/carbon footprint) and comparing them with industry benchmarks would solve the problem of individual stakeholders using different criteria and indicators. Panelists noted that it is no different than developing long-term goals and strategic plans where different criteria are used to make decisions in an effort to attain those goals. In the *Test Approach*, sustainable real estate decisions are one piece of the long-term strategic

planning process for the business as a whole. Many of the panelists who shared this perspective felt that organizations developing sustainable reporting practices, such as GRI and the Greenprint Foundation, would ultimately be the fastest and most efficient way to integrate standardized key performance criteria and indicators into the market.

### ***The Tiered-Approach***

Expert panel participants who identified with this approach to understanding the integration of sustainability into sustainable real estate decision-making and strategic planning share many of the same traits as the *Test Approach*. However, a key distinction is that this group recognizes that different tests might be necessary at different levels of interaction with the property. As such, this approach advocates that different criteria and indicators are necessary for decision-making, and influencing behavior, at each level of a real estate investment:

The investor has a very narrow interest and I suppose if you think about a life cycle of the building, each stage you have a different cocktail of interests...you have the developer and probably the agents, brokers and the tenants. When that space gets leased for a period of time and 90% of what is going on in that property depends on what the tenant is doing, that first lease ends and the owner comes to refurbish it, then you look at the owner and the owner's interests and change behaviors. Each stage has a different level of interests and you should try and go and package it – policies – to try to get each of those stages.

One example that was offered by a panelist suggested that whereas a property manager might want specific energy usage information about the HVAC system and

individual tenant demand to determine how to maximize the efficiency of the unit, an asset manager would want to know bulk information relating to benchmarks to see where the building was lagging, and by how much, and then assess whether an investment in a new HVAC system would be beneficial for the long-term investment. At the other end of the spectrum, a portfolio manager would want even less specific measures because they are more concerned with building level benchmark information that enables them to quickly determine whether an asset in their portfolio should be acquired, held, invested in or divested. Ultimately, this approach is not dissimilar to the *Test Approach*, however, its distinguishing characteristic is that it acknowledges there are different scales of decision-making and different time considerations (short- and long-term holding periods) over which those decisions have an impact on the organization. This group feels that the criteria and indicators used to make those decisions also needs to address that difference. Interestingly, experts with the broadest industry experience were most likely to advocate for the *Tiered-Approach* to sustainability integration.

### ***The Integrated Approach***

This approach takes a holistic, systems approach to integrating sustainability concerns (however they have identified them) throughout the real estate decision-making and strategic planning process. One of the panelists referenced the organization sustainability statement and noted that they seek to develop criteria and indicators that can inform decisions-makers at all stages of the decision-process:

We strive to embed meaningful and actionable sustainability metrics into our [investment] process. We recognize both quantitative and qualitative aspects must be considered...each play a role in evaluating the overall attractiveness of a particular acquisition, disposition, or other major investment decision.

In addition, another commonality among the experts who identified with this approach to integrating sustainability into the real estate decision-making and strategic planning process was the recognition that the concepts of ‘sustainability’ and ‘sustainable real estate’ are constantly evolving as new research emerges and new technologies are developed. Therefore, experts in this group indicated that they had a team devoted to engaging with “the earliest and best thought leaders and innovators”, and they placed an emphasis on “integrating the best sustainability ideas and practices from the U.S. and international markets.”

By considering sustainability concerns as part of the strategic decision-making process from the design and acquisition stages through development and redevelopment of the property and into the operations and occupancy stages – this approach placed a significant emphasis on the need to embed the concept of sustainability not only into the strategic decision-making process, but also into the everyday behaviors and practices for employees and tenants.

One example of integrating sustainability into everyday practice is the HinesGO program, an internal program used to measure and reward tenants in Hines office buildings for achieving the Hines ‘Green Office’ designation. This voluntary program evaluates six categories of sustainable practices within the office building and rewards



tenants in properties who achieve a minimum of 70 ‘Leaf Credits’. All of the office buildings in the Hines portfolio have achieved this designation. The categories of assessment used in the HinesGO program include: energy efficiency; people and atmosphere; reduce, reuse and recycle; LEED; travel & commuting; remodeling and construction.

## QUANTITATIVE ANALYSIS: DELPHI THIRD ROUND E-QUESTIONNAIRE

This section explores expert panelists’ e-questionnaire responses during the third round of the Delphi process. Panelists were first asked to identify themselves as the real estate stakeholder group which they currently represent as well as which real estate stakeholder groups they have previously represented (Exhibit 5.7). Panelists were also asked to identify how long they have worked in the real estate industry and how many of

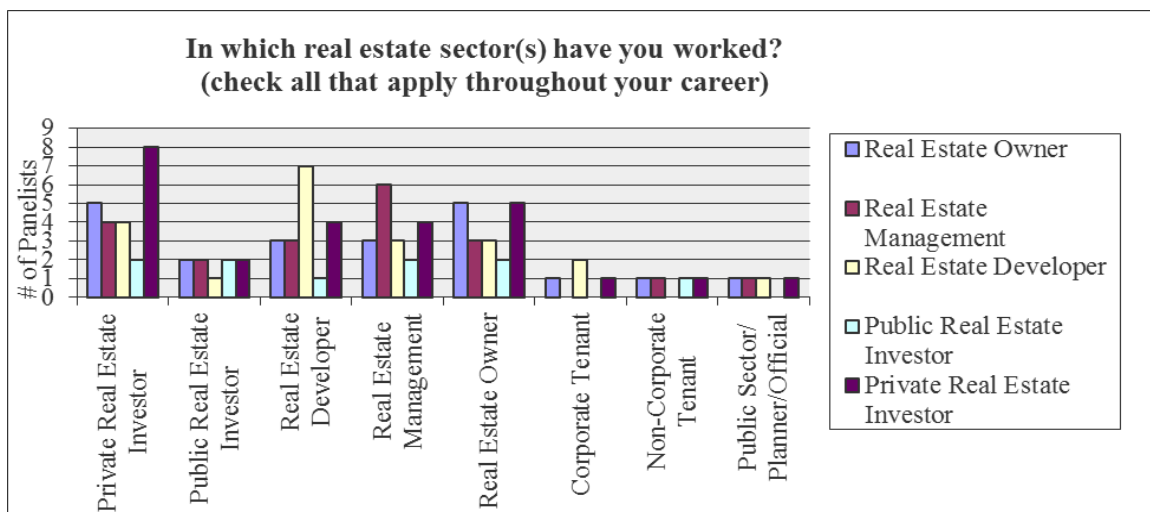


Exhibit 5.7: Breadth of Delphi Panel Experts’ Experience. Expert panelists’ current stakeholder group is represented in the bars of the chart (and in the legend). The chart represents the breadth of their real estate industry experience.

those years have been focused on addressing sustainability issues (See Exhibit C-2 in Appendix C).

Due to a limitation in the analysis software, data was only able to be cross-tabbed with five variables at a time. To determine which cross-tabulations would offer the most insight, the e-questionnaire results were initially run in multiple ways to gain a better understanding of the expert panelists responses. As a result of this preliminary analysis, as well as a review of how the expert panelists identified themselves in the e-questionnaire, e-questionnaire responses for several stakeholder groups were sometimes grouped to offer a more straightforward presentation of the results. In these cases, real estate owner and public and private investor responses were combined into a single ‘real estate investor’ group because of their similar responses. Similarly, responses from experts identifying themselves as real estate management and corporate tenants sometimes responded in an analogous manner and were therefore grouped together into a single ‘space occupier’ group. However, where a divergence remained between the different stakeholder responses, each of the stakeholder group responses are identified separately, although public and private investor responses remained grouped together as ‘real estate investor’ due to similar responses throughout the e-questionnaire.

The responses from the Delphi third round e-questionnaire were used to answer the secondary research questions about the drivers, criteria and indicators influential in the integration of sustainability concerns into strategic decision-making and planning. Each of the sub-sections that follow first summarize the results of the combined Delphi panel responses, and then discuss each topic from the perspective of the individual real estate

stakeholder groups. Similarities between the stakeholder groups are highlighted and key divergences between the stakeholder groups' responses are discussed. The answers to the following secondary research questions are discussed below:

- 1) To what degree are sustainability concerns integrated in the strategic decision-making and planning process?
- 2) What are the primary drivers (i.e. motivations) for pursuing the integration of sustainability initiatives?
- 3) What are the criteria used to make sustainable real estate decisions?
- 4) What are the key performance indicators (for sustainability assessment) used to make sustainable real estate decisions?
- 5) What are the functions of the sustainable criteria and indicators in the strategic decision-making and planning process (i.e. how are they used and for what purpose)?

### **Industry Leaders are Serious about Integrating Sustainability Issues into the Strategic Decision-Making and Planning Process**

The anonymous responses from the Delphi third round e-questionnaire were analyzed by the stakeholder group. The e-questionnaire asked expert panelists to indicate the frequency that sustainability concerns are integrated into their strategic decision-making process for real estate-related decisions using a Likert scale (5 = 'always', 1 = 'never'). Twelve panelists answered this question on the e-questionnaire. All of the experts who participated indicated that sustainability concerns are integrated 'frequently' (50%) or 'always' (42%) in strategic decision-making, with one exception. The outlier, self-identified as a real estate investor, indicated that sustainability concerns are currently integrated 'about half the time'.

## **Top Drivers for Integrating Sustainability Initiatives into Real Estate Decision-Making and Strategic Planning**

The e-questionnaire asked expert panelists to rate the level of importance of eighteen different drivers/reasons for including sustainability in the strategic decision-making process for real estate-related decisions using a Likert scale (5 = ‘very important’, 1 = ‘unimportant’). The anonymous responses from the Delphi third round e-questionnaire were analyzed by stakeholder group - the complete results can be seen in Appendix G. Overall, there was convergence among the majority of the stakeholders with regard to the most and least influential drivers motivating stakeholders to integrate sustainability into real estate decision-making and strategic planning (see Exhibit G-1 in Appendix G) with a few exceptions, discussed below. The top drivers emerging from the Delphi third round e-questionnaire and their mean values are:

- 1) Competitive advantage in the market/industry (4.09/5.0)
- 2) Changing standards for market competitiveness (3.99/5.0)
- 3) A sense of environmental responsibility (3.87/5.0)
- 4) A desire to positively contributing to society (3.87/5.0)
- 5) Governmental Legislation (3.86/5.0)
- 6) Energy Savings (3.85/5.0)

There was a high degree of convergence for the real estate developer and corporate tenant ratings, both of which ranked ‘competitive advantage in the market/industry’ and ‘sense of environmental responsibility’ among the most important drivers for including sustainability initiatives in the strategic decision-making process for real estate decisions (see Exhibit 5.8). Real estate owners and managers ranked these

|                                 | MOST Important Drivers |   | Second MOST Important |   |
|---------------------------------|------------------------|---|-----------------------|---|
|                                 | Rating                 | Sustainability Driver   | Rating                | Sustainability Driver   |
| <b>Summary of ALL responses</b> | 4.09                   | Competitive Advantage in Market/ Industry                               | 3.99                  | Changing Standards for Market Competitiveness                                   |
| <b>Real Estate Investor</b>     | 4.4                    | Government Legislation  | 4                     | Risk Management   |
| <b>Real Estate Developer</b>    | 4                      | Competitive Advantage in Market/ Industry                               | 3.8                   | Changing Standards for Market Competitiveness                                   |
|                                 |                        | Sense of Environmental Responsibility                                   |                       | Positively Contributing to Society  |
|                                 |                        | Desire to Transform Marketplace   |                       | Sense of Social Responsibility  |
|                                 |                        |   |                       | Energy Savings  |
| <b>Real Estate Management</b>   | 4.333                  | Risk Management   | 4                     | Competitive Advantage in Market/ Industry                                       |
|                                 |                        |   |                       | Sense of Environmental Responsibility   |
|                                 |                        |   |                       | Government Legislation  |
|                                 |                        |   |                       | Consumer and Occupant Opinion/Pressure  |
|                                 |                        |   |                       | Desire to Transform Marketplace   |
|                                 |                        |   |                       | Sense of Economic Responsibility  |
| <b>Real Estate Owner</b>        | 4.5                    | Government Legislation<br>Changing Standards for Market Competitiveness | 4                     | Competitive Advantage in Market/ Industry                                       |
|                                 |                        |   |                       | Changing Standards for Market Competitiveness                                   |
|                                 |                        |   |                       | Positively Contributing to Society  |
|                                 |                        |   |                       | Consumer and Occupant Opinion/Pressure  |
|                                 |                        |   |                       | Sense of Social Responsibility  |
| <b>Corporate Tenant</b>         | 4.667                  | Competitive Advantage in Market/ Industry                               | 4.333                 | Changing Standards for Market Legitimization<br>Desire to Transform Marketplace |
|                                 |                        | Changing Standards for Market Competitiveness                           |                       |   |
|                                 |                        | Sense of Environmental Responsibility                                   |                       |   |
|                                 |                        | Positively Contributing to Society                                      |                       |   |
|                                 |                        | Energy Savings  |                       |   |
|                                 |                        |   |                       |   |

Exhibit 5.8: Most Influential Drivers for Integrating Sustainability Initiatives into the Strategic Decision-Making and Planning Process. Detailed by stakeholder. Nine panelists answered this question.

drivers among the second most important drivers; however, real estate owners rated ‘government legislation’ and ‘changing standards for legitimization’ as the most important while real estate managers rated ‘risk management’ as the most important driver. Real estate investor motivations were most closely aligned with real estate owners; they rated ‘government legislation’ as the most important and ‘risk management’ as the second most important driver for integrating sustainability concerns.

### **Top Criteria Used in the Real Estate Decision-Making/Strategic Planning Process**

The anonymous responses to this question on the e-questionnaire, distributed as the third round of the process, were analyzed by the stakeholder group - the complete results can be seen in Exhibit G-2 (Appendix G). The Delphi third round e-questionnaire asked expert panelists to rate the level of importance of 29 different sustainability-related criteria used in the strategic decision-making process for real estate-related decisions. Participants were asked to rate each criteria using a Likert scale (5 = ‘very important’, 1 = ‘unimportant’). Nine experts on the Delphi panel answered this question. There was general agreement among the stakeholders with regard to which criteria were the most important used in real estate decision-making and strategic planning (see Exhibit 5.9), as well to which were the least important. The top criteria emerging from the Delphi third round e-questionnaire and their mean values are:

- 1) Occupant satisfaction (4.38/5.0)
- 2) Facility/building management team expertise (4.33/5.0)
- 3) Image/branding/PR (4.31/5.0)

- 4) Reduction in energy usage (4.21/5.0)
- 5) Monitoring of energy usage (4.14/5.0)
- 6) Indoor lighting/visual comfort for occupants (4.14/5.0)
- 7) Economic impact on the bottom-line (4.01/5.0)
- 8) Indoor thermal comfort for occupants (4.0/5.0)
- 9) Energy efficiency (3.95/5.0)

A few interesting divergences among the stakeholders emerged with regard to the sustainability criteria used in strategic decision-making. First, real estate developers rated ‘whole-life cycle value of the property’ and ‘building adaptability’ as two of the least important criteria, while all other panel participants rated these criteria somewhere in the middle. This makes sense because real estate developers are often involved with individual properties for a shorter period of time than other stakeholders.

Second, real estate owners rated ‘reuse of previously developed site’ among the list of third most important criteria in decision-making, while real estate managers rated it as the least important criteria. This also makes sense because owners are often involved with the property from the site acquisition and design stage, while real estate management engages in the decision-process at a later stage and most often has no influence on site selection.

Interestingly, real estate managers were the only stakeholders to rate ‘social cost/benefit analysis’ among the top criteria considered in decision-making, while all the other stakeholders rated this criteria as being among the least important criteria. This also makes sense because real estate managers are involved with local stakeholders

(tenants, community members and organizations, and the city) and they must therefore concern themselves with the social impact of actions. Not surprisingly, real estate management also rated 'image/branding/PR' among the most important criteria used in decision-making. From these responses we can conclude that although there is not complete agreement as to the most important and least important criteria, each of the stakeholder groups are using the criteria that best inform decisions related to their role in the real estate community.



|                                 | Rated the MOST Important Criteria |  | Rated the Second MOST Important Criteria |  | Rated the Third MOST Important Criteria |   |
|---------------------------------|-----------------------------------|--|--|--|---|---|
|                                 | Rating                            | Sustainability Criteria  | Rating                                   | Sustainability Criteria  | Rating                                  | Sustainability Criteria   |
| <b>Summary of ALL responses</b> | 4.38                              | Occupant Satisfaction  | 4.327                                    | Facility Management Team Expertise   | 4.307                                   | Image/Branding/PR   |
| <b>Real Estate Investor</b>     | 4.4                               | Economic Impact (on Bottom Line)   | 4.2                                      | <b>Occupant Satisfaction</b><br><b>Facility Management Team Expertise</b><br>Reduction in Energy Usage<br>Risk Reduction | 4                                       | <b>Image/Branding/PR</b><br>Monitoring of Energy Usage<br>Indoor Lighting/Visual Comfort for Users<br>Indoor Thermal Comfort for Users  |
| <b>Real Estate Developer</b>    | 4.6                               | <b>Facility Management Team Expertise</b>  | 4.2                                      | <b>Occupant Satisfaction</b><br><b>Image/Branding/PR</b><br>Reduction in Energy Usage<br>Monitoring of Energy Usage      | 4                                       | Indoor Lighting/Visual Comfort for Users<br>Indoor Thermal Comfort for Users  |
| <b>Real Estate Management</b>   | 4.333                             | <b>Occupant Satisfaction</b><br><b>Image/Branding/PR</b><br>Reduction in Energy Usage<br>Monitoring of Energy Usage<br>Economic Impact (on Bottom Line)<br>Energy Efficiency | 4  | Indoor Thermal Comfort for Users<br>Risk Reduction   | 3.667                                   | <b>Facility Management Team Expertise</b><br>Maintenance Considerations<br>Indoor Air Quality<br>Accessibility to Public Transportation<br>Social Cost/Benefit Analysis   |
| <b>Real Estate Owner</b>        | 4.5                               | <b>Occupant Satisfaction</b><br><b>Facility Management Team Expertise</b><br>Indoor Lighting/Visual Comfort for Users  | 4  | <b>Image/Branding/PR</b><br>Reduction in Energy Usage<br>Indoor Thermal Comfort for Users<br>Risk Reduction              | 3.5                                     | Monitoring of Energy Usage<br>Economic Impact (on Bottom-Line)<br>Energy Efficiency<br>Maintenance Considerations<br>Accessibility to Public Transportation<br>Community Impact Consultant & Assessment<br>Accessibility to Public Transportation<br>Reuse of Previously Developed Site |
| <b>Corporate Tenant</b>         | 5                                 | Indoor Lighting/Visual Comfort for Users<br><b>Image/Branding/PR</b>   | 4.667                                    | <b>Occupant Satisfaction</b><br><b>Facility Management Team Expertise</b><br>Monitoring of Energy Usage                  | 4.333                                   | Reduction of Energy Usage<br>Energy Efficiency<br>Indoor Air Quality  |

Exhibit 5.9: Most Influential Sustainability Criteria in Sustainable Real Estate Decision-Making. The three most important drivers for integrating sustainability issues into the real estate decision-making and strategic planning process for all of the respondents and by respondent group. Nine panelists answered this question.

## Key Performance Indicators Used in Assessment of Sustainable Real Estate

The key performance indicators (KPIs) mentioned by almost all the expert panel participants were heavily weighted toward environmental assessment, and include: energy usage, water consumption, reduction of waste and carbon/GHG emissions (see Exhibit 5.10). Interestingly, these are also among the KPIs used in the assessment of

| Key Performance Indicators (KPI)<br>for Sustainable Real Estate |
|---|
| Energy  |
| Water   |
| Waste   |
| Carbon  |
| Building Assessment Rating System<br>(LEED/EnergyStar)          |
| Sustainability Reporting Compliance<br>(GRI CRESS/Greenprints)  |
| Communication with employees,<br>tenants and other stakeholders |
| Risk Management   |

Exhibit 5.10: Key Performance Indicators (KPI) Used in Sustainable Real Estate Assessment.

participating organizations in the *GRESB 2012 Report*. Building assessment rating systems [e.g. EnergyStar and LEED (US), NABERS and GreenStar (Australia), Energy Performance Certificate and BREEAM (UK)] were also among the most referenced key performance indicators for developers and corporate tenants, which makes sense because they build/retrofit/occupy properties and can use the rating systems' certification for image/PR/branding purposes (rated among the

most important sustainability criteria and indicators by both stakeholder groups, see below). Various sustainability reporting guidelines (e.g. Global Reporting Initiative and Greenprint Foundation) were also referenced as an indicator that is being required for some stakeholders to meet in-house sustainability requirements, particularly for real estate investors, management and corporate tenants. This is unsurprising because they

have stockholders and/or property tenants when they need to communicate their efforts and also to assess their progress toward meeting sustainability goals and objectives.

Few social factors of sustainability were discussed in relation to the KPIs used in sustainability assessment, however, several expert panel participants discussed requirements related to communication about sustainability efforts with tenants, employees and other stakeholders (such as stockholders, vendors and staff). Along these lines, some organizations have implemented in-house rewards/designations for achievement of sustainability in their properties (e.g. Hines GO designation, see Exhibit 5.11).



Exhibit 5.11: HinesGO Scorecard. The six categories and 25 criteria assessed in the HinesGo Scorecard (Hines, 2011, used with permission from Hines).

Although not all stakeholder groups addressed risk management in the discussion of key performance indicators, it should be noted that ‘risk reduction’ and ‘risk management’ were rated as an important function of criteria in decision-making (see next section, below) and an important driver for including sustainability considerations in the decision-making process, respectively, for both real estate investors and management experts on the Delphi panel. It was also rated as the most important function of criteria and indicators for decision-making purpose by real estate investors, second most important function by corporate tenants and third most important function by real estate owners. Therefore, ‘risk management’ has been included on the list of KPIs. Interestingly, ‘risk management’ was rated among the least important function of criteria and indicators by the real estate management stakeholders.

### **Functions of Sustainability Criteria and Indicators in the Strategic Decision-Making Process**

The anonymous responses from the Delphi third round e-questionnaire were evaluated by stakeholder group and the results can be seen in Exhibit 5.12. There was convergence among most of the stakeholders with regard to the most important function of the sustainability criteria and indicators in the decision-making process – real estate owners, corporate tenants and developers all rated ‘integrated performance management’ the most important function of sustainability criteria and indicators in the strategic decision-making and planning process. A notable exception is among the expert panelists who identified themselves as real estate management in the e-questionnaire.

These respondents ranked ‘integrated performance management’ as the least important function of criteria and indicators in the decision-making process.

#### USE OF CRITERIA AND INDICATORS IN THE REAL ESTATE STRATEGIC DECISION-MAKING AND STRATEGIC PLANNING PROCESS

| Indicator Function                                    | Mean Value           | Real Estate Investor | Real Estate Developer | Real Estate Management | Real Estate Owner   | Corporate Tenant     |
|---|----------------------|----------------------|-----------------------|------------------------|---------------------|----------------------|
| Integrated Performance Management (systems approach)  | 5.89 <sup>(1)</sup>  | 4.6                  | 7.4 <sup>(1)</sup>    | 3.33 <sup>(L1)</sup>   | 6.5 <sup>(1)</sup>  | 7.67 <sup>(1)</sup>  |
| Risk Management                                       | 5.83 <sup>(2)</sup>  | 7.4 <sup>(1)</sup>   | 4.8                   | 4.0                    | 5.5 <sup>(3)</sup>  | 7.0 <sup>(2)</sup>   |
| Portfolio-Level Assessment                            | 4.94 <sup>(3)</sup>  | 5.0 <sup>(3)</sup>   | 3.4                   | 6.33 <sup>(1)</sup>    | 5.5 <sup>(3)</sup>  | 5.67 <sup>(3)</sup>  |
| Monitoring of Cost                                    | 4.89                 | 5.4 <sup>(2)</sup>   | 5.4 <sup>(3)</sup>    | 5.0 <sup>(3)</sup>     | 4.0                 | 3.67                 |
| Integrated Decision-Making (business scorecard model) | 4.67                 | 5.2                  | 5.6 <sup>(2)</sup>    | 5.67 <sup>(2)</sup>    | 2.5 <sup>(L1)</sup> | 4.33                 |
| Registration and/or Green Certification Requirement   | 4.11                 | 3.6                  | 3.6                   | 4.33                   | 4.0                 | 5.67 <sup>(3)</sup>  |
| Balanced Scorecard (Triple-Bottom Line)               | 4.11                 | 2.0 <sup>(L1)</sup>  | 5.6 <sup>(2)</sup>    | 4.67                   | 4.0                 | 4.67                 |
| Life-cycle Analysis                                   | 3.72                 | 3.0 <sup>(L2)</sup>  | 4.6                   | 3.67 <sup>(L2)</sup>   | 6.0 <sup>(2)</sup>  | 2.0 <sup>(L2)</sup>  |
| Accountability/Reporting Requirements                 | 3.5 <sup>(L2)</sup>  | 5.0 <sup>(3)</sup>   | 2.2 <sup>(L1)</sup>   | 4.67                   | 4.0                 | 1.67 <sup>(L1)</sup> |
| Monitoring (emissions, usage of key resources)        | 3.33 <sup>(L1)</sup> | 4.8                  | 2.4 <sup>(L2)</sup>   | 3.33 <sup>(L1)</sup>   | 3.0 <sup>(L2)</sup> | 2.67                 |

Exhibit 5.12: The three most important, denoted by the superscript <sup>(1, 2, 3)</sup>, and the two least important denoted by the superscript <sup>(L1, L2)</sup>, functions of sustainability criteria and indicators in the strategic decision-making and planning process are identified by stakeholder. Green delineates the most important and red delineates the least important. Nine panelists answered this question.

A few divergences also emerged from the analysis. The first is a divergence in the function of the sustainability criteria and indicators for ‘accountability and reporting requirements’. This was ranked the third most important function for real estate investors, while it was ranked the least important for developers and corporate tenants. These rankings make sense for real estate investors (who have fiduciary responsibilities

to their clients and are required to issue annual performance reports) and developers (who are most concerned with performance and cost issues). This was, however, a surprising finding for corporate tenants, many of whom have CSR requirements.

Real estate owners rated ‘integrated performance management’ as the most important function of sustainability criteria and indicators, but ranked ‘integrated decision-making’ as the least important. This seemed counterintuitive at first, however, when considering that these functions had been identified as ‘systems approach’ vs. ‘business scorecard approach’ it made more sense – particularly in light of real estate ranking ‘life-cycle analysis’ as the second most important function of sustainability criteria and indicators in the strategic decision-making process. Because owners hold the property for an extended period of time, they take a systems approach to assessment of sustainability and are concerned with the life-cycle impacts of their decisions, as well as understanding the ‘risk’ and ‘portfolio-level impacts’ of sustainability criteria (ranked third for owners).

Similarly, real estate investors emphasized the importance of sustainability criteria and indicators for ‘risk management’, which they rated as the most important, and ‘portfolio-level assessment’, which they ranked as the third most important use. Real estate managers also emphasized ‘portfolio-level assessment’, ranking it the most important function of sustainability criteria and indicators. Like real estate owners, real estate investors and managers take a long-term view of real estate. However, unlike owners, real estate investors and managers ranked ‘life-cycle analysis’ as the second least important use of criteria and indicators. Instead, real estate investors, as mentioned

above, were concerned with ‘risk management’ and the ‘monitoring of costs’ associated with sustainability initiatives (ranked third most important). This makes sense because of the fiduciary duties real estate investors have to their clients. Meanwhile, real estate managers were concerned with the ‘balanced scorecard model’ for integrated decision-making (ranked as the second most important use) and ‘monitoring of costs’ associated with sustainability initiatives (ranked third most important). This also makes sense because real estate managers are concerned with day-to-day operations of properties.

One surprising finding was the real estate managers’ ranking of ‘integrated performance management’ and ‘monitoring of emissions’ as the least important function of sustainability criteria and indicators in strategic decision-making. This low ranking of emissions monitoring is particularly interesting when considered in contrast to the ranking of ‘integrated performance management’ as the most important use of criteria and indicators in the strategic decision-making and planning process by real estate owners, corporate tenants and developers. It indicates a divergence in the marketplace that needs to be addressed as real estate managers may not be collecting data on and/or communicating about sustainability issues important real estate developers, owners and space occupiers.

## **WORD FREQUENCY ANALYSIS**

To evaluate whether the above results from the phenomenographic analysis of the Delphi process were reasonable, a word frequency analysis was conducted on the consolidated transcripts from the interviews to quantitatively determine which topics the experts had focused on during the first round Delphi interviews. First, all the interview transcripts were activated in MaxQDA, and then the word frequency application was run. This created a complete list of 138,468 total words, represented in 6,523 different words, used during the approximately sixteen and a half hours of interviews (16:38:40). Four rounds of analysis were used to complete the word frequency analysis. A minimum of two days were left between each round of analysis so that the list could be reviewed with ‘fresh eyes’.

The first round eliminated non-research-related words (including all articles, prepositions and pronouns), leaving 30,980 total words represented by 1,883 different words. The second round referenced words that were questionable (for example built, question, and know) in the context of the interviews, and eliminated words which were not directly related to the research questions. After eliminating non-researcher-related words, 29,378 words remained and were represented by 1,750 different words. These words were then analyzed to tease out the most important themes from the interviews (i.e. the categories of description). Thirteen preliminary themes emerged: sustainability; legal and regulatory; market-related; environment; economic costs and performance; social responsibility; performance reporting and measurement; risk management; physical and



locational attributes of property; climate change; strategic decision-making; behavioral and other.

The third round of review removed non-specific action words (including words such as know, think and talk) and the list was further reduced to 15,767 total words represented by 1,569 different words. Upon several more readings of the list, the preliminary categories of description were revised to more accurately capture the different themes resulting in a final list of fourteen themes. The final list of themes is: economic factors, including costs, performance and market resilience and market transformation; decision making strategies and drivers; environment and energy; physical and locational attributes of property; performance reporting and measurement; sustainability (the word and or 'green'); legal and regulatory; social responsibility; behavioral; global warming, climate change and emissions; risk management; barriers and trends; technology and innovation and other. Of the reduced list of 15,767 words 13,399 words were able to be categorized within the fourteen themes, leaving 2,357 in the 'other' category. The categorized words capture approximately 10% of the total list and 85% of the reduced, research-related word list.

In the last round of analysis, the list was again reviewed several times. All non-categorized words were eliminated (including the 'other' category which included words such as common, industry and types) while some action words were moved back into the list after reconsidering their context and determining that they directly related to the research questions (such as think, pay and use). This left a total of 14,456 words, represented by 1,250 different words. All the words on the list were categorized into one

of the themes. The themes did not change from round three to round four, with the exception of eliminating the ‘other’ category, leaving thirteen categories of description (see Exhibit H-1 in Appendix H). Finally, a word frequency visualization was created for the final, reduced list of research-related words to graphically illustrate the frequency with which the words occurred in the interviews (see Figure 5.13).



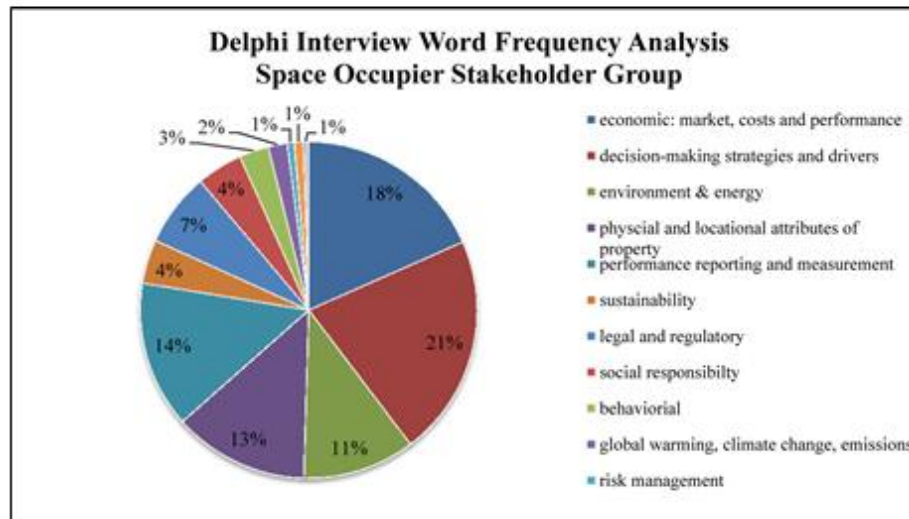
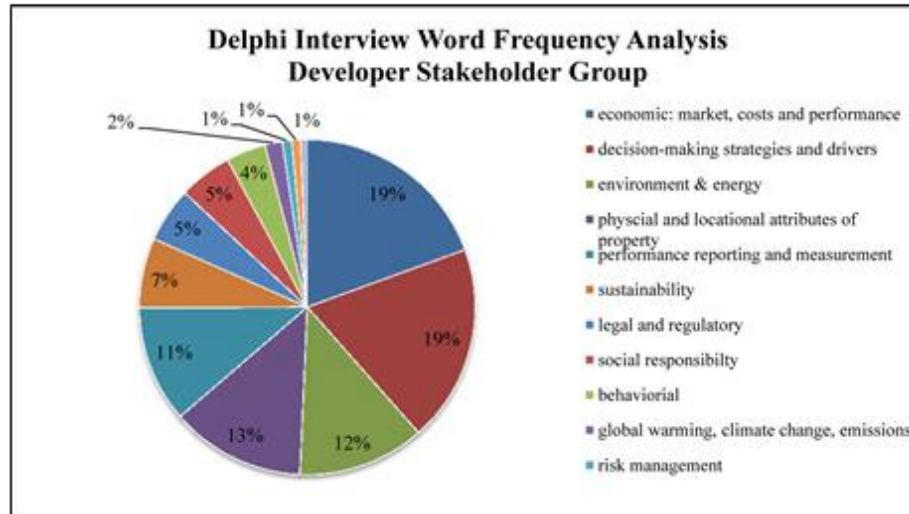
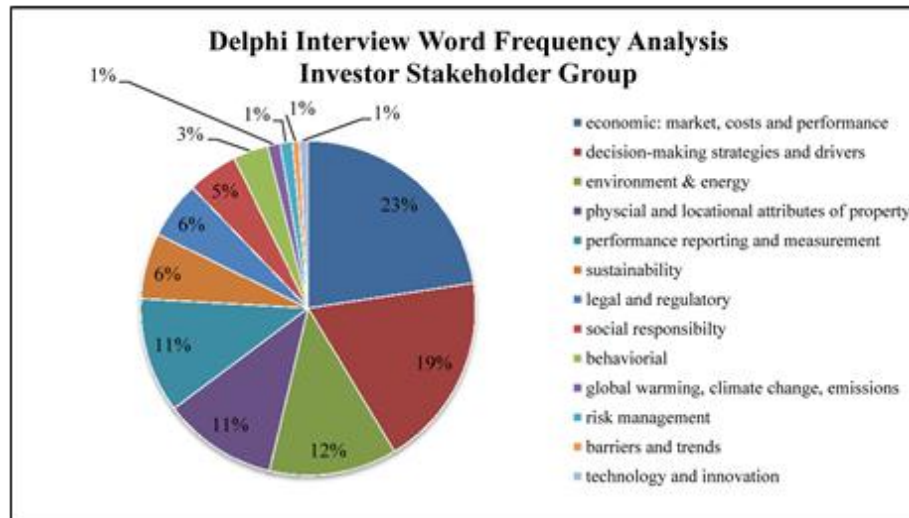
Exhibit 5.13: Word Frequency Visualization. Increased size of words in the word frequency visualization above indicates an increased number of times the word was used during the Delphi interview with expert panel participants.

Lastly, the categorized words and word frequencies were grouped by stakeholder group, detailed in Figure 5.14, and compared with the results from the Delphi process. Panel A includes the word frequency for the Investor Stakeholder group (this includes both the public and private investors on the expert panel), Panel B includes the results for

the Developer Stakeholder group, and Panel C includes the results from the Space Occupier Stakeholder group (this includes both the real estate management and corporate tenants on the expert panel). The results were then compared with the results from the phenomenographic analysis of the Delphi interview to see how they compared and whether the results from the Delphi process were reasonable.

It is interesting to note that each of the stakeholder groups spent approximately the same amount of time talking about each of the themes developed in the word frequency analysis. However, it is important to keep in mind that although the word frequency analysis gives an overview of the direction stakeholders took the conversation during the interviews, it does not distinguish between the importance of each category in the decision-making and strategic planning process for the stakeholder. For example, economic impacts of sustainability initiatives were discussed at length in the interviews, however this category was only ranked as the seventh most important criteria influencing the decision-making process.

This indicates that economic impact is more important than what was acknowledged by the panel participants (either intentionally or unintentionally) during the interviews and in the e-questionnaire. Sustainability criteria related to occupant satisfaction ranked first, sixth and eighth in importance to the decision-making process, while energy usage ranked fourth, fifth and ninth, indicating that social and environmental considerations are accurately represented in the pie charts as influential.



## TEN LESSONS LEARNED

This chapter provides an overview of the phenomenographic analysis of the interviews and e-questionnaire conducted as part of the Delphi process, as well as the word frequency analysis that was conducted on the consolidated interview transcripts. To ensure anonymity for the expert panel participants, only non-identifying quotes were chosen. It was also for this reason that there were no frequencies associated with the individual outcome spaces. From the results, a few key lessons can be highlighted:

1. Within the real estate community there are five different ways of understanding the concept of ‘sustainability’ and four different ways of understanding the concept of ‘sustainable real estate’.
2. Industry leaders (as represented by the expert panel) are serious about integrating sustainability issues into the decision-making process, but the stakeholders take different approaches (test, tiered or fully integrated) to accomplish this goal.
3. The top drivers for pursuing sustainable real estate initiatives are common to all of the stakeholder groups.
4. The most important functions of sustainability criteria and indicators used in the decision-making/strategic planning process were the same among all stakeholder groups. The few divergences between the stakeholder groups made sense in the context of where they are in the real estate process, and in essence mean that they are focusing on the things most important to their immediate business

responsibilities. However, this indicates that over time, as sustainability concerns become further engrained in day-to-day business, there are a few opportunities to evolve and streamline the key criteria used in decision-making which might in turn also improve transparency and competition in the growing sustainable real estate market.

5. Key performance indicators (KPIs) used for assessment of sustainable real estate focus primarily on the environmental impacts of actions. There is a lot of room to grow with regards to the data collected and reported in the real estate industry.
6. Panelists all advocated for simplicity of the sustainability criteria and indicators, arguing that long checklists were unrealistic. This was emphasized as particularly important when developing decision-making and assessment strategies at the portfolio level where it became cumbersome to collect the data necessary to answer longer checklists (for example for commissioning requirements) on each property in the portfolio. With regard to the need to simplify checklists as the scope of real estate decision-making expanded, one expert panelist noted:

I suppose the technicians in this area that did the questionnaires with fifty questions on it to really find out how sustainable a building is but...we bundled however many hundred properties we've bought and it becomes 17,500 questions we'd have to ask, that is just not a practical business process. I think what we have inadvertently stumbled on here, in my view, I'm not saying by any means it's very good, but what it does allow is for whole portfolio metrics to be created reasonably painlessly. You're sticking to very simple things asked in a very simple way and I think it could be

seen as the thin end of a very desirable wedge that where the big technical systems by asking fifty answers on every property get nowhere on a portfolio level. If you ask ten or eleven questions in this year for our portfolio, next year you might ask twelve to fifteen and can ask those questions of an organization like to drive the wedge in a little at a time to get proper portfolio metrics...and diagnostics.

7. Common criteria were in general less important to practitioners than the literature indicates. Different metrics may be necessary to enable strategic decision-making and assessment at different levels of the real estate process – for example, facility management, building management, asset management and portfolio management may all have different reporting structures of collected data to enable efficient decision-making related to sustainable real estate issues. Instead, members of the expert panel emphasized that getting the broader real estate industry gathering data on key performance indicators (KPIs such as water, waste, carbon and energy) are more important. This would also enhance transparency and market competition because investors and space occupiers would be able to assess possible investments based on industry wide benchmarks for each KPI.
8. When analyzing the most important uses of criteria and indicators in the strategic decision-making and planning process, key divergences in understanding were made apparent and may be the reason for the multitude of criteria and indicators currently being used in the real estate industry for sustainability decision-making and assessment. The most important divergence being that real estate management practitioners rated integrated performance management (i.e. a

systems approach) to be the least important function of the sustainability criteria and indicators, while this criteria was rated the most important by real estate developers, owners and corporate tenants. During the Delphi interviews, one expert panelist talked about real-time data collection and reporting as a means of trying to influence tenant behavior to become more sustainable, but acknowledged they were struggling in trying to determine what data was the most important to report. Perhaps the challenge of finding ‘the right data’ to collect and report is a result of this divergence of what each of the stakeholders deems to be important information, as well as how each of the stakeholders uses the data in decision-making.

9. Focus on sustainability reporting guidelines and encourage other real estate community members to participate in them as well. Panelists felt that these reporting guidelines (GRI, CRESS, Greenprint Foundation) are likely to be the quickest and least painful way of standardizing criteria and indicators used in the decision-making process because the benchmarking processes are created using industry input. Through their benchmarking procedures, they are also gaining a broader industry buy-in because participants are given feedback on how their operations compare with competitors – not via a direct comparison, but via an industry benchmark created from all the participants’ data.
10. The primary barrier to developing a transparent sustainable real estate market was the same for all of the expert panelists – lack of broker understanding as to how



sustainable real estate can offer clients additional benefits over non-sustainable buildings. Most acknowledged that among the majority of real estate brokers ‘sustainability’ is most often considered exclusively as a LEED or EnergyStar rating. The perception among the expert panel is that brokers feel that sustainability concerns are just one more thing that can make a deal fall through. Therefore, they de-emphasize the importance of, or any potential positive impacts of, sustainability attributes. Instead of encouraging tenants looking for space to lease a ‘green’ space, experts perceived brokers focused more on the ability for the tenants to get cheaper space in a non-‘green’ property.

## CHAPTER SIX

### RESEARCH CONTRIBUTIONS AND INDUSTRY APPLICATIONS

#### **INTRODUCTION**

As discussed in Chapter Two, the majority of sustainable real estate research over the past five years has consisted of research using quantitative methods to explore sustainability-related issues in real estate. This is in no small part because academics and leading practitioners have been actively working to ‘make the business case’ for integrating sustainability concerns and initiatives into the real estate so that the broader industry would also ‘jump on the bandwagon’. Since Miller, Spivey and Florance (2008) first published their empirical research on the relationship between sustainable attributes (as represented by LEED and EnergyStar certifications) and rental and market premiums in sustainable real estate, there has been an increase of empirical evidence supporting the business case for sustainable real estate. Eichholtz, Kok and Quigley (2010b), expanded the scope of empirical research to investigate *motivations* influencing ‘green’ location decisions by corporate tenants using information from the CoStar Tenant Module. Only one other study was uncovered which focused on sustainability issues that influence the decision-making process by real estate stakeholders. Focusing on the business perspective of real estate, McCarty, Jordan and Probst (2011) offer guidance on how to use the Six Sigma leadership approach to develop and implement sustainability initiatives in real estate. No studies were found that looked at the breadth of real estate stakeholders and investigated the drivers/motivations for pursuing sustainability initiatives, the

sustainability criteria and indicators used to make decisions about sustainability or how sustainability considerations were integrated into the strategic decision-making and planning process for real estate. This research aims to fill this gap in the research. In Chapter Five, the different ways of understanding the concepts of ‘sustainability’ and ‘sustainable real estate’ and different approaches to integration of sustainability concerns in the strategic decision-making process were discussed.

Building on the results in Chapter Five, this chapter aims to provide the industry with a theoretical framework to aid practitioners in sustainable real estate strategic decision-making. Following the discussion of the decision-making framework developed for industry practitioners, the methodological contributions of this research are discussed. The chapter concludes with an outline of opportunities for future research.

## **INDUSTRY CONTRIBUTIONS: A FRAMEWORK FOR SUSTAINABLE REAL ESTATE DECISION-MAKING AND ASSESSMENT**

Since the 1970s, we have seen a significant change in the attitudes of the society, governments and the business community toward sustainability-related measures and regulations. Over the past five years, the industry has struggled through the mortgage crisis and the recession - and a new period is emerging in which the real estate industry is addressing sustainability issues using a more holistic, systems approach. However, the economic challenges of the past few years have left their mark. Companies are no longer adopting sustainability concerns solely for reasons related to ‘social good’; instead, they

are focusing on how to ‘prove’ to their stakeholders that they are focused on sustainable property performance and management – and that sustainability-related initiatives can positively impact their bottom-line. The current market conditions have forced companies to address market uncertainties, and industry leaders are using sustainability initiatives as a means of managing risks and meeting the requirements of a market in transition. Companies are increasingly judged not only by the corporate social responsibility values, reflected in their CSR statements, but by the actions through which those values are actualized and how these actions impact their financial stability. This also extends to how companies make decisions about sustainability initiatives for their real estate assets.

These market changes have resulted in new strategies for decision-making and assessment of both specific sustainability initiatives and sustainable real estate. Simons, Slob, Holswilder and Tukker noted that “more complex and more integrated strategies will be needed to deal with the new societal challenges now associated with sustainability” (2001: 55-56). Almost a decade later, we are again at the dawn of a new generation of strategies and eco-indicators. Building on Simons, Slob, Holswilder and Tukker, this research proposes that the real estate industry has entered a new generation of strategic decision-making and assessment. Exhibits 6.1 and 6.2, presented in the next two sections, detail the first four generations of strategic sustainability management attributes presented by Simons, Slob, Holswilder and Tukker (2001), and a fifth column has been added to incorporate the current strategies used for decision-making and assessment of sustainable real estate. This last column is developed from the results of

the Delphi study and represents the commonalities between the experts' approaches to integrating sustainability concerns into the strategic decision-making and planning process. Exhibit 6.1 details the framework for sustainable real estate decision-making and strategic planning while Exhibit 6.2 highlights the framework for sustainable real estate assessment.

### **A Framework for Sustainable Real Estate Decision-Making and Strategic Planning**

The framework for sustainable real estate decision-making and strategic planning offers industry practitioners an overview of the public and societal demands influencing real estate industry stakeholders' strategic decision-making strategies, the drivers motivating stakeholders to engage in sustainable practices, the scope of measures used in decision-making and company attitudes that influence the strategies of sustainability integration in real estate (Exhibit 6.1). The first four columns highlight the factors which influenced the four generations of strategic decision-making and planning process from the 1970s – 2000s (Simons, Slob, Holswilder and Tukker, 2001). The fifth column offers industry practitioners and academics insight into how these categories are influencing the real estate decision-making and strategic planning process of current industry leaders, as ascertained from results of the Delphi study used in this research.

| A Framework for Sustainable Real Estate Decision-Making |                                 |                                 |  |                             |                                      |
|---|---------------------------------|---------------------------------|--|-----------------------------|--------------------------------------|
| Strategy Influencers                                    | First Generation (1970s)        | Second Generation (1980s)       | Third Generation (1990s)                 | Fourth Generation (2000s)   | Fifth Generation (2010s)             |
| Public/Societal Influence                               | ‘Trust Me’                      | ‘Tell Me’                       | ‘Show Me’                                | ‘Involve Me’                | ‘Prove to Me’                        |
| Drivers   | Legislation and Public Pressure | Energy Savings, Waste Reduction | Strategic Tool for Competitive Advantage | Societal License to Operate | Market Resilience and Transformation |
| Measures  | Clean-up Operations (EIA)       | Prevention (SEA)                | Product Life Cycle                       | Sustainability Measures     | Key Performance Indicators (KPI)     |
| Attitude of Companies                                   | Hostile, Defensive              | Active, Sense of Responsibility | Proactive                                | Contribute to Society       | Integrated, Systems Approach         |

Exhibit 6.1: A Framework for Sustainable Real Estate Decision-Making. Modified and expanded upon Simons, Slob, Holswilder and Tukker (2001).

The first category of the framework addresses the real estate industry’s perception of public/societal attitude toward real estate stakeholders and the requirements of stakeholders with regard to communication/reporting of sustainability activities. Expert panelists had a range of responses in the Delphi third round e-questionnaire. The two primary answers were that the public wants real estate stakeholders ‘to demonstrate’ (44%) and ‘to prove’ (22%) they are making positive change(s) and that their properties are performing in a responsible and sustainable manner. This is reflected in the decision-making framework as the public asking the real estate industry to ‘Prove to Me’ that a company is making positive changes in their real estate investment/management/space

occupancy/development decisions and that their properties/leased spaces are performing in a sustainable manner.

As discussed in Chapter Five, expert panelists identified ‘competitive advantage’ and ‘changing standards for market competitiveness’ as the leading drivers motivating the real estate industry to get engaged in sustainable real estate. In addition, real estate investors and owners identified that ‘government legislation’, ‘changing standards for legitimization’ and ‘risk management’ were also a important drivers. These drivers have been reflected in the decision-making framework as ‘Market Resilience and Transformation’.

The ‘Lessons Learned’ section at the end of Chapter Five described the ‘Key Performance Indicators’ (KPIs) currently being used in the real estate industry. As noted by the expert panelists, the collection and reporting of data related to these KPIs is really the first step to achieving consistency in measures and metrics in the real estate industry with regards to sustainability issues. The recent development of the common carbon metric (UNEP/SBCI, 2010), which measures energy usage and carbon emissions, is an example of the real estate industry’s focus on developing these key performance indicators. This trend has been reflected in the third category of the decision-making framework; ‘Key Performance Indicators’ have been noted as the overarching type of measure characterizing the fifth generation of sustainable real estate decision-making.

The top rated functions of sustainability criteria and indicators in the strategic decision-making and planning process during the Delphi process were: ‘integrated performance management using a system approach’, ‘risk management’ and ‘portfolio

level assessment'. What all of these decision-making criteria and indicators have in common is that they are holistic in nature and require consideration of the many facets of the real estate asset class. As such, the attitude of companies toward sustainability integration has been identified in the fourth category of the decision-making framework as an 'Integrated, Systems Approach', because leaders are searching for opportunities in which they can reap synergistic rewards from their sustainability initiatives.

### **A Framework for Sustainable Real Estate Assessment and Management**

As with the framework for sustainable real estate decision-making, the framework for sustainable real estate assessment and management offers an overview of the scope, expression and functions of eco-indicators influencing the strategies of sustainable real estate assessment and management as detailed in Exhibit 6.2. As in the previous section, the first four generations (columns) summarize the work of Simons, Slob, Holswilder and Tukker (2001) while the fifth generation offers industry practitioners insight to how these eco-indicators are influencing industry leaders and were derived from the modified Delphi Method used in this research. Simons, Slob, Holswilder and Tukker defined eco-indicators as "an ideal instrument to support the strategic decision-making process, as well as a useful compass on the road to sustainability...Eco-indicators enable managers to monitor the results of measures taken, communicate about the company's [sustainability] performance, and compare its performance with that of other companies" (2001: 51). In other words, eco-indicators gather the information necessary to inform the



| Framework for Sustainable Real Estate Assessment and Management |   |   |  |   |  |
|---|---|---|--|---|--|
|   | First Generation<br>(1970s)                     | Second Generation<br>(1980s)                              | Third Generation<br>(1990s)                            | Fourth Generation<br>(2000s)  | Fifth Generation<br>(2010s)                              |
| Eco-Indicator Scope   | End-of-Pipe Measures to <i>Reduce</i> Emissions | Processes-Integrated Measures to <i>Prevent</i> Pollution | Supply Chain Management, Product Design <i>Process</i> | 3E's of Sustainability  | Market Competitiveness, Legitimization, & Responsibility |
| Eco-Indicator Expression  | Emissions, Costs                                | Material & energy use, Efficiency                         | Eco-efficiency, Product characteristics                | Resources, Societal Costs/Contribution, Normative Values            | Impact Efficiency, Lifecycle Analysis                    |
| Eco-Indicator Functions   | Registration, Monitoring                        | Process Changes, Communication (internal & external)      | Product Design, Balanced Scorecard                     | Internalization, Portfolio Assessment, Accountability, Compensation | Integrated Performance and Risk Management               |
| Reference Values  | Regulatory targets                              | Other processes Previous years                            | Other products, Other Suppliers                        | Societal Values, Sustainability Issues                              | Market/ Competition, Societal Values, Sustainability     |
| Example of Criteria   | Emissions                                       | Environmental Burden                                      | Resource Efficiency                                    | Societal Contribution   | Environmental Impact                                     |
| Example of Indicators   | Emissions records, Toxic release inventory      | Traditional EIA   | Type and Quantity of Materials Used                    | Community Support Efforts (e.g. sponsor community events)           | Carbon Footprint of Organization ( <i>GHG Protocol</i> ) |

Exhibit 6.2: Framework for Sustainable Real Estate Assessment and Management. Modified and expanded upon Simons, Slob, Holswilder and Tukker (2001).

strategic decision-making and planning process and can be used in different ways to communicate to different audiences.

The first step in using the ‘Framework for Sustainable Real Estate Assessment and Management’ is understanding the audience and scope at which the eco-indicators

will be applied. Are they communicating information about an individual building system, a process, a property, the property lifecycle, or a portfolio of properties? An inherent property of an eco-indicator is its lack of intrinsic value; its significance is created through comparison with a reference value – a benchmark. For example, in the fourth category of the framework, the eco-indicator reference values used would vary depending on the scope for which the eco-indicator was providing a measure. Sample eco-indicator reference values include: previous years' performance, Greenprint Foundation scorecards, or internally established targets/goals (e.g. for carbon footprint reduction). Reference values are further broken down into sustainability criteria, which identify specific items within the eco-indicator scope to be measured, and indicators, which are the metrics used to measure specific criteria. Again, the type of reference value varies depending on the audience with whom the real estate stakeholder is aiming to communicate with and/or report performance to, as well as the scope about which they are communicating. Expert panelists identified the scope of eco-indicators as 'market competitiveness' and 'legitimization' in the market as well as an overarching sense of 'responsibility' toward their stakeholders, community and the environment. The latter was most commonly outlined specifically in the corporate social responsibility statements of the organizations. In turn, reference values related to market conditions and the desire to remain competitive in the market, social values, and larger sustainability issues. An example of a specific criterion (environmental impact) and its associated indicator (carbon footprint target for the organization) are shown at the bottom of the framework for sustainable real estate assessment and management table (Exhibit 6.2).

Individual eco-indicator criteria and indicators used to gather information can be expressed differently to different audiences. The eco-indicator expression goes hand-in-hand with the function of the eco-indicators – i.e. what the criteria and indicators are used for in the strategic decision-making and planning process. For example, if the function is monitoring of consumption, the expression might be the property's total water consumption; if the function is benchmarking for the purpose of integrated performance management, the expression might be the energy efficiency/performance over the lifecycle of the property; and if the function is risk management, the expression might be the efficient management of environmental impact and its financial impact. The eco-indicator expressions, 'Impact Efficiency' and 'Life Cycle Analysis', are expressed in the second row of the framework for sustainable real estate assessment and management. The eco-indicator functions, 'Integrated Performance Management' and 'Risk Management' are expressed in the third row of the framework.

### **Applying the Framework for Strategic Decision-Making and Assessment**

The framework developed above can be modified and applied by stakeholders at all levels of the real estate process by choosing the appropriate eco-indicator scope and reference value, and clearly delineating the function and expression of the eco-indicators to ensure that data gathered offers the information and insight needed to fulfill the objectives of the stakeholder. Keeping the above-mentioned framework in mind, the development of a sustainability transfer function (as outlined in detail in chapter three of

McCarty, Jordan and Probst, 2011) can help real estate stakeholders develop a specific decision-making and assessment strategy that meets their individual objectives.

## **METHODOLOGICAL CONTRIBUTIONS**

This research also offers methodological contributions to real estate research. Pivo (2008) used the Delphi Method to study 54 criteria and indicators used in Responsible Property Investment (RPI). This research adds to that body of work using a modified Delphi Method and the research has employed a new software program, MaxQDA, to assist with coding of the qualitative data gleaned from the expert panelists. In addition, the research offers a new methodology, phenomenography, for use in the analysis of qualitative data in real estate research.

This is the first qualitative real estate research in the US that the researcher is aware of that has employed MaxQDA to analyze the expert panelists transcribed interviews. For real estate researchers exploring qualitative issues like motivations, actions and decision-making, the MaxQDA software is a useful tool to effectively and efficiently analyze qualitative data from interviews, secondary sources and tables. Its flexibility at allowing either pre-set or in-vivo coding allows researchers to analyze text with regards to specific topics of interest or to allow the themes to emerge through an iterative, phenomenological or phenomenographic approach.

## **Phenomenography as a Methodology for Real Estate Research**

The conceptual framework of the phenomenographic methodology is described in detail in Chapter Three, and Chapter Four outlines how the methodology was applied in this research. By using a phenomenographic approach in this research, the researcher was able to identify the current divergence in the ways of understanding the concepts of ‘sustainability’ and ‘sustainable real estate’ as well as in the approaches used in the industry to integrate these concepts into the strategic decision-making and planning process.

For real estate research that aims to gain an in-depth understanding of a qualitative phenomenon, such as decision-making motivations or strategies, this methodology can be a useful approach. Phenomenology, the more frequently used approach for exploring phenomenon, considers the areas where the phenomenon of interest is perceived to be similar and is useful for understanding the essence of a phenomenon – much like the use of a mean or medium numerical value in quantitative analysis. However, when researchers are looking to understand the specific areas of discord, disagreement, and/or divergence in the way participants perceive a phenomenon, the phenomenographic approach offers much richer insights. As the scope of sustainable real estate research continues to expand to topics such as motivations, strategies of decision-making and integration, the results of research using a phenomenographic methodology can offer insights that can aid in guidelines and policy development, standardization of terminology and metrics and improved transparency in the sustainable real estate market.

## **OPPORTUNITIES FOR FUTURE RESEARCH**

Research employing qualitative methods for exploratory and descriptive purposes, such as this one, is often used to establish a base of information upon which further research can be conducted. The research in this study captures a snapshot of how leading real estate experts (represented by the Delphi panel) understand the concepts of ‘sustainability’ and ‘sustainable real estate’, as well as how they integrate these concepts into sustainable real estate decision-making and assessment.

A limitation of this research is its limited transferability. The logical extension of this research is to test whether the broader real estate industry agrees or disagrees with the perceptions and behaviors of the experts who participated in the Delphi study. The industry survey will also expand the research scope to consider how sustainability is understood and integrated in non-class-A office space and smaller markets, as well as for non-corporate tenants. Replication of the study in other locations, such as Australia and the United Kingdom, which are home to many of the world’s leading sustainable real estate funds (GRESB, 2012, 2011), would also provide useful information about sustainability for the global real estate community. Identifying divergence in understanding between not only real estate stakeholders, but the perceptions of those stakeholders in different global markets would be useful for real estate stakeholders working multiple global markets. In addition, the real estate industry in these countries is in many cases further along in mainstreaming sustainability concerns into strategic real estate decision-making throughout the real estate industry. Understanding the strategies used to advance sustainable real estate in other parts of the world would be helpful in the

United States. Taking a global perspective in future research will assist the global real estate community in increasing their understanding of the divergence between stakeholders and in thereby improve communication among stakeholders. Both of these opportunities are discussed in more detail below.

### **Industry Survey**

As noted in Chapter Four, this research is intended to be the first phase of a larger mixed methods research study. The second phase involves an industry-wide survey and will allow the researcher to gain quantitative feedback on how the industry at large understands the concepts of ‘sustainability’ and ‘sustainable real estate’, the functions of the sustainability criteria and indicators used to make decisions about and assess performance of sustainable real estate, and how each of the real estate stakeholders are integrating these concepts into their strategic planning and decision-making process. The industry survey will also enable the researcher to identify gaps between industry leaders (represented by the Delphi panelists) and the industry at large with regard to the understanding of these concepts and their integration of sustainability issues in the strategic planning and decision-making process.

The survey format will be an e-questionnaire, which will be distributed to representatives of the different stakeholder groups using the mailing list for the primary industry organizations of each stakeholder group. The survey has already been developed using the format suggestions of Dillman, Smyth and Christian (2008) and

input from the Delphi panel. Survey questions were pre-tested with the Delphi panelists as part of the round three e-questionnaire (as these experts were familiar with both the sampling frame populations and the purpose of the research) to evaluate the length, format and wording of the e-questionnaire. In addition, a pilot of the survey was funded by the Land Economic Foundation (LEF) and was been distributed to members of the Lambda Alpha International (LAI) and the Counselors of Real Estate (CRE). Based on feedback from the pilot study which included 60 survey respondents (unknown response rate as the invitation to participate was sent in-house by the organization to their member mailing list), the survey instrument has been revised and will be ready to be used in the next phase of the research.

### **Comparative Studies: Replication in Other Global Markets**

Replication of the study in other global markets might initially begin with studies in the United Kingdom and Australia, as these two countries are among the leaders in both sustainable real estate policy and regulations (for example, each have requirements for energy audits prior to a property being sold) and public awareness of the importance of integrating sustainability throughout decisions applying to all aspects of daily life. For example, the public supported a tax on automobiles entering into the central business district of many large cities in the United Kingdom, and in Australia carbon neutral goals for cities, Sydney and Melbourne among them, were supported by local residents. These markets are also ideal for this type of study because real estate research in those markets faces additional research challenges in that there is no national database from which to



glean empirical data (in contrast to the recent empirical studies using the CoStar and NCREIF databases in the United States). Replication of this study would therefore help identify specific strategies being used for strategic decision-making and planning in sustainable real estate, enable comparison with the strategies being used in the US and assist in identifying transferable strategies to other global markets.

The study can also be replicated at a larger scale by looking at the strategies for creating carbon neutral cities. For example, by comparing Seattle (the first large US city to make a carbon neutrality pledge), Copenhagen (the first capital city to make a carbon neutrality pledge) and Sydney and Melbourne (among the first cities globally to make a carbon neutrality pledge). As the built environment is integral in achieving these goals, understanding the strategies to reduce the carbon footprint of buildings could offer interesting insights to influence building renovation and retrofit strategies.

Lastly, replication of the study in emerging markets, such as China and India, could assist policy makers in those countries in developing sustainable real estate strategies to get ahead of some of the impending challenges with regard to their inevitable national carbon footprint increase. As noted by the IPCC (2007), China's carbon footprint in 2007 was at exactly the carrying capacity of the world. Its projected growth in population over the next decade could have serious negative impacts on the environment, with ramifications felt not only within China but globally. By understanding current sustainable real estate strategies and challenges in these markets, a replication of this study in China could assist policy makers in reducing the inevitable impact of increasing urbanization and growth in population over the next decades.

## **SUMMARY**

The results of this research aim to contribute to the sustainable real estate industry and offer guidance to practitioners interested in getting ‘on the sustainability band wagon’ but unsure of where to start. This study has added important insights into understanding the divergent ways real estate stakeholders understand not only the concepts of ‘sustainability’ and ‘sustainable real estate’, but also the strategies used to integrate these concepts into their strategic decision-making process. By helping real estate stakeholders understand how their collaborators in the real estate process think and make decisions about sustainability in commercial real estate, as well as how they assess performance of sustainable real estate, the research aims to assist practitioners in developing their own strategic plan to integrate sustainability issues and concerns into their own decision-making and planning process.

In addition to providing the industry with a guiding framework for decision-making and assessment of commercial real estate, this study also offers two methodological contributions for use in future real estate research. The qualitative data analysis software (MaxQDAplus) used in the data analysis offers a new software to improve the efficiency, effectiveness and robustness of qualitative research in real estate research. In addition, the phenomenographical methodology applied in this study offers the real estate research community a new qualitative analysis method to help identify divergent opinions, motivations and understanding of a phenomenon.

Lastly, this study adds to the growing body of work concerned with sustainability issues in commercial real estate, and makes the case that we need to understand more

than ‘just’ the empirical implications of implementing sustainability initiatives, such as premiums in rent and market value, but that understanding the qualitative aspects influencing decision-making is equally important. Without understanding the motivations of *why* and *how* people make decisions about ‘sustainability’ in real estate, we face an uphill struggle to mainstream sustainable real estate. This study offers guidance on the motivations influencing sustainable behavior and decisions in real estate, the criteria and indicators used to make and assess properties in a sustainable manner and guidance for practitioners new to sustainable real estate on how to integrate sustainability initiatives into the strategic decision-making and planning process.

## APPENDICES

## APPENDIX A - BUILDING ASSESSMENT RATING SYSTEMS

| EXISTING INTERNATIONAL RATING TOOLS |                |               |                                 |  |
|-------------------------------------|----------------|---------------|---------------------------------|--|
| Continent                           | Rating Tool    | Country       | Launch Date/<br>Current Version | Website  |
| Africa (1)                          | Green Star SA  | South Africa  | 2008/2008                       | <a href="http://www.gbcsa.org.za/greenstar">www.gbcsa.org.za/greenstar</a>   |
|                                     |                |               |                                 |  |
| Asia (17)                           | GBAS           | China         | 2006                            | <a href="http://www.cngbn.com/">www.cngbn.com/</a>   |
|                                     | HK-BEAM Plus   | Hong Kong     | 1996/2010                       | <a href="http://www.beamsociety.org.hk">www.beamsociety.org.hk</a>   |
|                                     | CEPAS          | International | 2006                            | <a href="http://www.bd.gov.hk">www.bd.gov.hk</a>   |
|                                     | GRIHA          | India         | 2009                            | <a href="http://www.grihaindia.org">www.grihaindia.org</a>   |
|                                     | LEED India     | India         | 2007                            | <a href="http://www.igbc.in;">www.igbc.in;</a>   |
|                                     | IGBC Green     | India         | 2010 Pilot                      | <a href="http://www.igbc.in">www.igbc.in</a>   |
|                                     | CASBEE         | Japan         | 2002/2008                       | <a href="http://www.ibec.or.jp">www.ibec.or.jp</a>   |
|                                     | GBI(M)         | Malaysia      | 2009                            | <a href="http://www.greenbuildingindex.org;">www.greenbuildingindex.org;</a>   |
|                                     | QSAS           | Qatar         | 2009/2010                       | <a href="http://qsas.org">qsas.org</a>   |
|                                     | BREEAM Gulf    | Qatar         | 2008                            | <a href="http://www.breeam.org">www.breeam.org</a>   |
|                                     | Green Mark     | Singapore     | 2005/2010                       | <a href="http://www.greenmark.sg;">www.greenmark.sg;</a><br><a href="http://bca.gov.sg/GreenMark">bca.gov.sg/GreenMark</a>   |
|                                     | KGBCC          | South Korea   | 2002/2006                       | <a href="http://greenbuilding.or.kr">greenbuilding.or.kr</a>   |
|                                     | ABRI EEWH      | Taiwan        | 1999/2003                       | <a href="http://gsp.stsipa.gov.tw;">gsp.stsipa.gov.tw;</a><br><a href="http://www.taiwangbc.org.tw">www.taiwangbc.org.tw</a> |
|                                     | LOTUS          | Vietnam       | 2010                            | <a href="http://vgbc.org.vn">vgbc.org.vn</a>   |
|                                     | Estidama Pearl | UAE           | 2010                            | <a href="http://estidama.org">estidama.org</a>   |
|                                     | LEED Emirates  | UAE           | 2011                            | <a href="http://www.emiratesgbc.org/egbc">www.emiratesgbc.org/egbc</a>   |
|                                     | BREEAM Gulf    | UAE           | 2008                            | <a href="http://www.breeam.org">www.breeam.org</a>   |
|                                     |                |               |                                 |  |
| Australia (3)                       | Green Star     | Australia     | 2003/2008 (2010)                | <a href="http://www.gbca.org.au/green-star">www.gbca.org.au/green-star</a>   |
|                                     | NABERS         | Australia     | 2000/2005                       | <a href="http://www.nabers.com.au">www.nabers.com.au</a>   |
|                                     | Green Star NZ  | New Zealand   | 2007/2008                       | <a href="http://www.nzgbc.org.nz/main/greenstar">www.nzgbc.org.nz/main/greenstar</a>   |

| <b>EXISTING INTERNATIONAL RATING TOOLS - continued</b> |  |                |   |   |
|--|--|----------------|---|---|
| <b>Continent</b>                                       | <b>Rating Tool</b>                     | <b>Country</b> | <b>Launch Date/<br/>Current Version</b> | <b>Website</b>  |
| Europe (10)  | PromisE                                | Finland        | 2004/<br>under development              | <a href="http://virtual.vtt.fi">virtual.vtt.fi</a> ;<br><a href="http://www.promiseweb.net">www.promiseweb.net</a>                      |
|  | HQE                                    | France         | 2005/2008                               | <a href="http://www.certivea.com/uk">www.certivea.com/uk</a>  |
|  | DGNB                                   | Germany        | 2009                                    | <a href="http://www.dgnb.de">www.dgnb.de</a>  |
|  | Living Building<br>Challenge           | Ireland        | 2010                                    | <a href="http://ilbi.org/countries/ireland">ilbi.org/countries/ireland</a>  |
|  | Protocollo<br>ITACA                    | Italy          | 1996, 2011                              | <a href="http://www.itaca.org">www.itaca.org</a>  |
|  | BREEAM<br>Netherlands                  | Netherlands    | 2010                                    | <a href="http://www.breeam.nl/breeam">www.breeam.nl/breeam</a>  |
|  | LIDER A                                | Portugal       | 2005/2009                               | <a href="http://www.lidera.info">www.lidera.info</a>  |
|  | Verde                                  | Spain          | 2009                                    | <a href="http://www.gbce.es">www.gbce.es</a>  |
|  | MINERGIE                               | Swiss          | 2008                                    | <a href="http://www.minergie.com">www.minergie.com</a>  |
|  | BREEAM                                 | UK             | 1990/2011                               | <a href="http://www.breeam.org">www.breeam.org</a>  |
|  | LEnSE                                  | EU             | 2008                                    | <a href="http://www.lensebuildings.com">www.lensebuildings.com</a>  |
|  | GreenBuilding<br>Programme             | EU             | 2005/2009                               | <a href="http://www.eu-greenbuilding.org">www.eu-greenbuilding.org</a>  |
|  | Energy<br>Performance<br>Certification | EU             | 2007/2009                               | <a href="http://www.buildup.eu">www.buildup.eu</a><br>DIRECTIVE 2002/91/EC:<br><a href="http://eur-lex.europa.eu">eur-lex.europa.eu</a> |
|  |  |                |   |   |
| North<br>America (8)                                   | LEED                                   | USA            | 1998/2009                               | <a href="http://www.usgbc.org">www.usgbc.org</a>  |
|  | Green Globes<br>US                     | USA            | 2004                                    | <a href="http://www.thegbi.org/green-globes">www.thegbi.org/green-globes</a>  |
|  | Energy Star                            | USA            | 1995/                                   | <a href="http://www.energystar.gov">www.energystar.gov</a>  |
|  | Living Building<br>Challenge           | USA            | 1996/2010                               | <a href="http://ilbi.org/countries/united-states">ilbi.org/countries/united-states</a>  |
|  | LEED Canada                            | Canada         | 2002/2011                               | <a href="http://www.cagbc.org">www.cagbc.org</a>  |
|  | Living Building<br>Challenge           | Canada         | 2009                                    | <a href="http://ilbi.org/countries/canada">ilbi.org/countries/canada</a>  |
|  | LEED<br>Mexico/SICES                   | Mexico         |   | <a href="http://www.mexicogbc.org">www.mexicogbc.org</a>  |
|  | Living Building<br>Challenge           | Mexico         | 2009                                    | <a href="http://ilbi.org/countries/mexico">ilbi.org/countries/mexico</a>  |

| <b>EXISTING INTERNATIONAL RATING TOOLS - continued</b> |                            |                        |   |  |
|--|----------------------------|------------------------|---|--|
| <b>Continent</b>                                       | <b>Rating Tool</b>         | <b>Country</b>         | <b>Launch Date/<br/>Current Version</b> | <b>Website</b>   |
| South America (5)                                      | LEED Argentina             | Argentina              |   |  |
|  | LEED Brasil                | Brazil                 | 2008                                    | <a href="http://www.gbcbrasil.org.br">www.gbcbrasil.org.br</a>   |
|  | AQUA                       | Brazil                 | 2008                                    |  |
|  | LEED Chile                 | Chile                  |   | <a href="http://www.chilegbc.cl">www.chilegbc.cl</a>   |
|  | LEED Colombia              | Columbia               | 2009 ?                                  | <a href="http://www.cccs.org.co">www.cccs.org.co</a>   |
|  |                            |                        |   |  |
| International (6)                                      | BREEAM Global              | International          | 2011                                    | <a href="http://www.breeam.org">www.breeam.org</a>   |
|  | SB Tool (formerly GB Tool) | International          | 2007/2010 (1998/2005)                   | <a href="http://www.iisbe.org/sbtool">www.iisbe.org/sbtool</a> ;<br><a href="http://www.iisbe.org/iisbe/gbc2k5.htm">www.iisbe.org/iisbe/gbc2k5.htm</a> |
|  | LEED International         | International          | 2011                                    | <a href="http://www.usgbc.org">www.usgbc.org</a>   |
|  | CEN/TC350                  | International Standard | 2010/2011/2012/2013                     | <a href="http://www.cen.eu">www.cen.eu</a>   |
|  | ISO 14000 Series           | International          | 2004                                    | <a href="http://www.iso.org">www.iso.org</a>   |
|  | ISO/TC59/SC17 (ISO 21931)  | International Standard | 2006/2007/2008/2010                     | <a href="http://www.iso.org">www.iso.org</a>   |

Exhibit A-1: List of Existing International Rating Tools Used in Sustainable Real Estate Decision-Making and Assessment, by Continent.

## APPENDIX B - PRELIMINARY LIST OF CRITERIA USED IN SUSTAINABLE REAL ESTATE DECISION-MAKING

This list was developed from the review of academic and professional literature review (see Chapter 2), a review of building assessment rating systems, the guidelines for sustainability reporting, and the review of secondary information downloaded from the websites of the firms/companies of the experts participating in the Delphi Method panel.

| List of ESG, Physical, Location, Land Use and Legal Criteria<br>Used in Sustainable Real Estate Decision-Making |   |
|---|---|
| Category  | Attributes  |
| Economic Factors  | <ul style="list-style-type: none"> <li>Current value of real estate asset</li> <li>Financial implications and other risks and opportunities related to sustainability issues</li> <li>Operating Costs</li> <li>For existing buildings: increase in post-adaptation value</li> <li>Construction and development costs</li> <li>Convertibility (ease of conversion to other use and costs associated with the conversion)</li> <li>Impact of infrastructure investment and services developed primarily for public use and benefit</li> <li>Total value of financial and in-kind contributions to community - and political parties/lobbyists</li> <li>Perceived value of positive PR/branding associated with sustainability-related activities</li> </ul>   |
| Environmental Factors   | <ul style="list-style-type: none"> <li>Energy Efficiency (advanced metering, building commissioning analysis &amp; implementation, performance tracking)</li> <li>Renewable energy and carbon offsets</li> <li>Internal environment quality</li> <li>Total direct and indirect GHG emissions (from buildings, construction &amp; redevelopment activities)</li> <li>Existence of hazardous materials (asbestos)</li> <li>Water Use (intensity of use &amp; ability to meter by building and by source)</li> <li>Waste (creation, policy and management)</li> <li>Refrigerant management</li> <li>Pollution/Contamination</li> <li>Biodiversity value and impact of real estate activities</li> <li>Natural Resource Use (Materials)</li> <li>Materials (% cycled/reused, quantity, % waste, % local)</li> <li>Site improvement and management strategies (heat island reduction, rainwater management, light pollution)</li> </ul>  |
| Social Factors  | <ul style="list-style-type: none"> <li>Community benefits – historic listing</li> <li>Transportation-related noise</li> <li>Employee training opportunities</li> <li>Urban regeneration</li> <li>% of operations with implemented local community engagement</li> <li>Operations with potential or actual negative and positive impacts on local community</li> <li>Number of persons (voluntarily or involuntarily) displaced and/or resettled as a result of real estate activities</li> <li>Aesthetic impact on community</li> <li>Provision of additional facilities / amenities</li> <li>Proximity to hostile factors</li> <li>Occupant and user satisfaction and comfort(internal air quality, lighting and daylighting quality, views, thermal )</li> <li>Health, Safety and Well-Being</li> <li>Green cleaning policy</li> <li>Access to Transportation and Alternative Modes of Transit</li> <li>Perceived positive impact of PR/branding associated with sustainability-related activities</li> <li>Accessibility in the site and facility layout and design</li> </ul> |



| List of ESG, Physical, Location, Land Use and Legal Criteria<br>Used in Sustainable Real Estate Decision-Making (con't) |   |
|---|---|
| Category  | Attributes  |
| Governance Factors  | Governance structure and committees<br>Stakeholder engagement (list of stakeholders, basis for selection of stakeholders, approaches for engagement)<br>Commitments to External Initiatives<br>Diversity of governance body<br>Linkage between compensation for executives and sustainability performance<br>Mechanisms for resolving conflicts of interest<br>Mechanisms in place for shareholder and employees to offer ideas and feedback<br>Mission Statement in place related to implementation of sustainability issues<br>Procedures for oversight of implementation in place<br>Process for evaluating sustainability performance in place<br>Explanation of whether and how precautionary principle is considered in decision-making<br>Initiatives to reduce GHG emissions and measured reductions achieved<br>Prevention and mitigation measures implemented to minimize/eliminate negative ESG impacts on community |
| Physical Factors  | Adaptability<br>Floor plate size<br>Shape of floor plate<br>Service core location<br>Elasticity (ability to extend laterally or vertically)<br>Degree of attachment to other buildings<br>Access to building<br>Height of floors<br>Longevity<br>Structure<br>Floor strength<br>Distance between columns<br>Frame & Shell (material selection)<br>Flooding<br>Deconstruction (safe efficient and speedily )<br>Expandability (volume and capacity)<br>Flexibility (space planning)<br>Technological and convertibility<br>Dis-aggregability (reusability / recyclability)   |
| Location and Land Use Factors   | Transportation<br>Access (proximity to airports, motorways, train stations, public transport nodes, buses and trams, etc.)<br>Land uses (commercial, residential, retail and industrial or mixed use - such as office and retail)<br>Existing planning zones<br>Rezoning potential<br>Incentives for implementation of sustainability initiatives<br>Density of occupation  |
| Legal Factors   | Ownership<br>Use – multiple or single tenants<br>Building codes<br>Fire codes<br>Health and safety issues<br>Convertibility   |

Exhibit B-1: List of ESG, Physical, Location, Land Use, and Legal Criteria Use in Sustainable Real Estate Decision-Making. This list of criteria influential in sustainable real estate decision-making was developed from the literature review and review of secondary sources. These criteria were discussed with experts and refined during the Delphi Method interviews into the list of criteria and indicators used in the Round Three e-questionnaires.

## APPENDIX C - DELPHI EXPERT PANELIST LIST AND QUALIFICATIONS

| Expert Panelist Name    | Title   | Company Name/<br>Location  | Stakeholder/<br>Country                         |
|-------------------------|---|--|---|
| Patty Connolly          | Director of Global Sustainability   | RREEF<br>New York, NY  | Private Investor, US                            |
| Christian Gunter        | Director<br>Formerly:<br>USA: Sustainability                                    | Sellen Sustainability<br>Seattle, WA<br>Bentall Kennedy            | Developer/Consultant/<br>Private Investor, US   |
| Paul McNamara           | Director: Head of Research;<br>Chairperson                                      | PRUPIM, London<br><br>UNEP-FI sub-committee                        | Public & Private Investor, UK/Global            |
| Jim Lutz                | Senior Vice President, Development  | Liberty Property Trust<br>Malvern, PA                              | Public Investor/<br>Developer, US               |
| Tom Ricci               | Executive Vice President  | Thomas Property Group<br>Los Angeles, CA                           | Public Investor/Owner/<br>Developer, US         |
| Eleni Reed              |   | General Service Administration (GSA)<br>Washington, DC             | Government/Tenant, US                           |
| Jean-Francois Champigny | Partner, Sustainability Coordinator   | Progena by PwC<br>L-1014 Luxembourg                                | Owner/Tenant, Global                            |
| Theddi Wright Chappell, | Senior Managing Director, National Practice Leader<br>Green Advisory Practice   | Cushman & Wakefield of Colorado, Inc.<br>Park City, UT             | Owner/Tenant/<br>Valuation, US                  |
| David L. Pogue          | National Director of Sustainability   | CBRE<br>San Francisco, CA  | Owner/Tenant, US                                |
| Dan Probst              | Chairman, Energy and Sustainability Services, Americas, Energy & Sustainability | Jones Lang LaSalle<br>Chicago, IL                                  | Owner/Tenant, US                                |
| David Borchardt         | Chief Sustainability Officer  | Tower Properties (privately held)<br>Rockville, MD                 | Developer/Private Investor, US                  |
| Sarah Cary              | Sustainable Developments Executive  | British Land Company Plc, London                                   | Developer/Public Investor, Global               |
| Louise Ellison          | Director of Sustainability  | Quintain Estates and Development<br>London                         | Developer/Public & Private Investor, Global     |
| Gary Holtzer            | Sr. Managing Director, Global Sustainability Officer                            | Hines (privately held)<br>San Francisco, CA                        | Developer/Owner/<br>Investor, US                |
| Scott Muldavin          | President, Executive Director   | The Muldavin Company<br>Green Building Finance Consortium, Seattle | Valuation, US<br>Broad Industry Perspective, US |

Exhibit C-1: List of Expert Panel Participants in the Delphi Study.

| <b>Expert Panelist Name</b>    | <b>Years Industry/ Sustainability Experience</b> | <b>Involved In Strategic Decision-Making</b> | <b>Published Or Recognized In Publications</b> | <b>Represent Broad Range Of Knowledge</b> | <b>Referred By Another Panelist (#)</b> |
|--------------------------------|--|--|--|---|---|
| <b>Paul McNamara</b>           | 25/15  | YES  | YES  | YES                                       | YES (2)                                 |
| <b>Patty Connolly</b>          | 20/6   | YES  | YES  | YES                                       | YES (3)                                 |
| <b>Scott Muldavin</b>          | 25/7   | YES  | YES  | YES                                       | YES (3)                                 |
| <b>Louise Ellison</b>          | 10/5.5   | YES  | YES  | YES                                       | YES (2)                                 |
| <b>Jim Lutz</b>                | 27/12  | YES  | YES  | YES                                       | YES (2)                                 |
| <b>Jean-Francois Champigny</b> | 9/7  | YES  | YES  | YES                                       | YES (2)                                 |
| <b>Sarah Cary</b>              | 10/10  | YES  | YES  | YES                                       | YES (2)                                 |
| <b>Tom Ricci</b>               | 26/20  | YES  | YES  | YES                                       | YES (2)                                 |
| <b>David Borchardt</b>         | 15/20  | YES  | YES  | YES                                       | YES (2)                                 |
| <b>Theddi Wright Chappell</b>  | 26/11  | YES  | YES  | YES                                       | YES (5)                                 |
| <b>Christian Gunter</b>        | 9/9  | YES  | YES  | YES                                       | YES (2)                                 |
| <b>Gary Holtzer</b>            | 27/27  | YES  | YES  | YES                                       | YES (2)                                 |
| <b>Dan Probst</b>              | 30/7   | YES  | YES  | YES                                       | YES (3)                                 |
| <b>David Pogue</b>             | 40/6   | YES  | YES  | YES                                       | YES (4)                                 |
| <b>Eleni Reed</b>              | 13/6   | YES  | YES  | YES                                       | YES (5)                                 |

Exhibit C-2: Qualifications of Expert Panel Participants. Matrix of expert panelists' qualifications for participating in the Delphi Method process. This matrix summarizes the qualifications in accordance with the expert qualification requirements developed in Chapter Three.

## **APPENDIX D - DELPHI METHOD: EXPERT PANELIST BIOS**

### **Sarah Cary, British Land Company PLC, Sustainable Developments Coordinator**

Sarah has responsibility for the management and implementation of the Sustainability Brief process at British Land, working closely with design and construction teams on environmental and social issues in major construction projects.

An experienced sustainability advisor with a formal background in town planning and urban design, Sarah has worked on projects ranging from urban extension master-planning to individual dwellings. She is also involved in British Land's corporate responsibility reporting; developing company strategy, understanding the carbon footprint, and engaging with stakeholders. She is a qualified BREEAM Assessor and LEED Accredited Professional and a member of the RTPI.

### **Jean-François Champigny, PwC Luxembourg, Partner**

Civil Engineer and Economist, aged 33 years, Jean-François joined PwC Corporate Finance in 2007 after three years of experience as a high-ranked civil servant in France. He is responsible for financial advisory assignments with a focus on the industrial and clean-tech sector, and has led numerous missions in that field (Mergers and Acquisitions, due diligences, valuations and preparation of business plans). Since 2009, Jean-François has been coordinating the efforts of PwC Luxembourg in the field of sustainable development. He has developed PwC "Sustainable Business Solutions" services offering, he supervised the preparation of the "2010 - Luxembourg Sustainability

Yearbook”, and organized the first edition of the “PwC Sustainability Day” in December 2010.

He was a member of the jury at the final of the European Venture Capital context, Barcelona, 2010, for clean-techs and renewable energy projects. He will be leading the new competency "Progena by PwC", a team of 20 engineers and economists specialized in environmental and social efficiency, aside Laurent Rouach. Jean-François graduated from Ecole Polytechnique, France, Corps des Ponts et Chaussées, and owns a master's degree in applied sciences in economy from the University of Montreal, Canada.

**Patricia A. Connolly, RREEF Real Estate, Director of Global Sustainability**

Patty Connolly is Director of Global Sustainability at RREEF Real Estate, and is charged with incorporating sustainability concepts into all aspects of the RREEF Real Estate investment management process. She is shaping and coordinating comprehensive world-wide sustainability and green building programming and related environmental and energy strategies. She joined RREEF Asset Management as Regional Director overseeing a commercial portfolio that grew from 800,000 sf to 18 million sf in 18 months. She transitioned to RREEF Portfolio Management working on two separate accounts, valued at \$1 billion and consisting of office, industrial, retail and multi-family assets. Prior to RREEF Real Estate, she was SVP with Shorenstein Realty Services overseeing a trophy office portfolio. She culminated a 14-year career with Jones Lang LaSalle as Regional Operations Manager in Manhattan with responsibility for a 23

million sq.ft. portfolio of commercial office buildings. During her Jones Lang LaSalle tenure, she specialized in office, retail and industrial property management and leasing. She is represented on a number of sustainability and charitable councils and boards. She earned her Bachelor of Science degree in Chemical Engineering from Tufts University and her MBA from Harvard Business School.

**Dr. Paul F McNamara, FRSA, Former Head of Research at PRUPIM**

Paul retired as Head of Research at PRUPIM in late September 2012 after 25 years with the company. He now acts as a part-time consultant for a range of property organisations. Paul became Head of Research at PRUPIM in 1990 and, in this capacity, was responsible for the overall direction of property research in the company. He was also a Board Director for his last 8 years with PRUPIM and was, for a time, Chairman of PRUPIM's Investment Committee.

Paul chaired the Institutional Investors Group on Climate Change – Property Workstream and was Co-chair of the UNEP-FI Property Working Group. Paul was Chairman of the Investment Property Forum (IPF) 2005/2006 and was honored by being made a Life Member of the IPF in January 2007. He is also a Fellow, past President and past Chairman of the UK Society of Property Researchers. Amongst other activities, Paul is also a Visiting Professor with the Department of Real Estate Management at Oxford Brookes University and a non-executive director at international property investment performance measurers, IPD Holdings Limited.

Paul was awarded the OBE for services to the property industry in the Queen's Birthday Honors list in Summer 2003 and was awarded a lifetime achievement award by IPE in 2008. He has published widely across a range of property-related topics, most recently specializing in property derivatives and the impact of sustainability on property investment.

**Scott Muldavin, CRE, FRICS, Rocky Mountain Institute Senior Advisor and Green Building Financial Consortium, Executive Director**

Scott Muldavin, CRE, FRICS is a Senior Advisor to the Rocky Mountain Institute and Executive Director of the Green Building Finance Consortium, a group he founded to improve valuation and underwriting practices to enable an assessment of sustainable properties from a financial perspective. His book: *Value Beyond Cost Savings: How to Underwrite Sustainable Properties* is the first to detail the mechanics of sustainable property valuation and underwriting.

Mr. Muldavin collaborates with many organizations seeking deeper value-based sustainability investments including the Department of State, US General Services Administration, Urban Land Institute, NAR, BOMA International, Royal Institute of Chartered Surveyors, National Building Sciences Institute, World Business Council for Sustainable Development (WBCSD), California Energy Commission and many others.

Mr. Muldavin's sustainability work builds on his recognized expertise in real estate finance, investment and valuation. Mr. Muldavin has served as President of The Muldavin Company, Inc., been a lead real estate partner at Deloitte & Touché, co-

founded Guggenheim Real Estate, a \$3+ billion private real estate company, served on the Advisory Board of Global Real Analytics, an advisor to \$2 billion of REIT and CMBS funds, and completed over 300 consulting engagements involving real estate finance, mortgage lending, investment, valuation, securitization and sustainability.

Mr. Muldavin has authored over 200 books and articles on real estate finance, investment, valuation, and sustainability. He is a graduate of UC Berkeley and Harvard University, and is a Counselor of Real Estate (CRE) and a Fellow of the Royal Institute of Chartered Surveyors.

**David Pogue, LEED AP<sup>®</sup>, CBRE, Global Director of Sustainability**

As Global Director of Sustainability, Dave Pogue is responsible for leading sustainability programs for CBRE's property and facilities management portfolio around the globe. Mr. Pogue manages the development, introduction and implementation of a wide-ranging platform of sustainable practices and policies, working closely with Facilities Management, Project Management, Global Corporate Services and Asset Services to focus on achieving a consistent balance of maximum financial performance and responsible environmental stewardship.

Mr. Pogue's leadership has produced an award-winning sustainability platform that leverages thought leadership, outstanding service delivery and corporate associations to raise the worldwide green building standard. Program achievements include aggressive endorsement of the U.S. EPA ENERGY STAR<sup>®</sup> program, the introduction of the Green



Knights, delivery of co-branded BOMA BEEP training to more than 10,000 attendees and recognition as the first manager of commercial property to certify more than 100 buildings in the LEED<sup>®</sup> for Existing Buildings rating system. CBRE was also ranked in *Newsweek's* list of the 500 greenest companies in the U.S., honored by the EPA as a five-time ENERGY STAR Partner of the Year and recognized by the U.S. Green Building Council<sup>®</sup> with the Leadership Award for Organizational Excellence.

Prior to leading sustainability programs, Mr. Pogue was Senior Managing Director of the Western Region and was responsible for all Asset Services operations in the western portion of the United States, overseeing service delivery for office, retail and industrial real estate properties totaling more than 250 MSF.

Mr. Pogue also served as Executive Vice President, Ownership Services, for Insignia/ESG in the Western Region and joined CBRE with the company's acquisition of Insignia. Before joining Insignia, he was Director of Management Services for CB Commercial in the San Francisco Bay Area.

Previously, he was a Regional Partner and Senior Vice President with the Koll Company in San Jose. During more than a dozen years with Koll, he was credited with establishing the Asset Management Division for both the San Jose and Pleasanton regions.

**Theddi Wright Chappell, CRE, MAI, FRICS, AAPI, LEED AP, Senior Managing Director and the National Practice Leader of the Green Advisory Practice within Cushman & Wakefield's Valuation & Advisory group.**

Theddi is a national speaker and educator on the implications of green strategies on asset value and serves as the Ambassador of Sustainable Initiatives for the Appraisal Institute. She is a Director of the Green Building Finance Consortium and was an organizer of and presenter at the international Vancouver Valuation Summits I and II in Vancouver, BC. Prior to joining C&W, she served as the CEO of Sustainable Values, Inc. in Portland, Oregon, where she specialized in market, feasibility and investment analysis, particularly related to valuation and financing of new, existing, and urban redevelopment projects, and the identification and quantification of the benefits of sustainable development.

Her experience is primarily in client solutions in both valuation and consulting assignments, with a focus on maximizing investment return and asset value. She has worked extensively with both national and international corporations, a variety of public and private entities, and members of the investment, financial, development, architectural and design communities. Her work has included a variety of valuations and real estate consulting assignments involving highest and best use analyses, market evaluations, and cost benefit analyses. She has written a number of case studies to identify the financial implications of green/sustainable elements, principles and practices on Market Value. She is experienced in all major sectors, including regional shopping centers and mixed-use office developments in both the US and abroad.

Theddi developed the Green Building Opportunity Index, the first office market assessment tool to provide weighted comparisons of top U.S. office markets on the basis of both real estate fundamentals and green development considerations, in collaboration with the Northwest Energy Efficiency Alliance and Cushman & Wakefield's Research Group.

## **APPENDIX E - DELPHI METHOD: ROUND ONE INTERVIEW QUESTIONS**

Before we start – do you need any clarification on what the goal of the research is? Do you understand the Delphi process and what my expectation are of you as a participant?

### **A. 10 Minutes : Life History**

1. What is your official role with \_\_\_\_\_?
2. How did you get involved in sustainability?  
What led to your current role with \_\_\_\_\_?
3. Do you sit on any professional committees where sustainability is the topic of study or implementation?

### **B. 15 Minutes: Definition of the Issue**

1. How do you define sustainability? (**Starter question**)
2. How does that differ in your mind to sustainable real estate? (**Starter question**)

### **C. 35 Minutes: Reflection of Meaning (not all questions will be asked)**

1. How are sustainability/sustainable real estate integrated into the strategic planning and decision-making process? (**Starter question**)
  - a. What *criteria* are currently being used by \_\_\_\_\_ to make decisions about sustainability in commercial (office) real estate?
  - b. What *indicators* are currently being used by \_\_\_\_\_ to assess sustainability in commercial (office) real estate?

- c. Do you have that in a written document? If yes, could I get a copy of it?
2. Do you think these criteria represent the *scope* of criteria used to decision-making as it relates to sustainable real estate? Do you feel there are there missing criteria or topic areas that should be considered in addition to these?
3. How does \_\_\_\_\_ use these criteria and indicators for *decision-making* related to sustainable real estate? Is sustainability integrated throughout the strategic planning and decision-making process or is it a specialty area within \_\_\_\_\_? **(Starter question)**
4. Do you think your *criteria and indicators* for sustainable real estate differs from the criteria and indicators used by other stakeholders in the real estate process (investors, occupiers, developers, planners)? If so, how?
5. If different, do you think the criteria used for sustainability decision-making impact/change the *process* differently for different stakeholder groups?
6. In general, do you think the *decision-making process* related to sustainable real estate differs from the process used by other stakeholders in the real estate process (investors, corporate users, more traditional tenants, developers, planners)? **(Starter question)**
  - a. If so, how?
7. Do you think that the criteria you use as a larger firm/organization/etc. can be modified for use by smaller firm/organization/etc.? Do you know if there are smaller companies that have already started this process?
8. Do you feel data is readily available to measure progress in attaining sustainability goals/criteria? If no, what are the biggest barriers to tracking progress? What are the biggest barriers to attaining the data?
9. How do you think the *recession/crash* has *impacted* the progress of sustainability in commercial real estate? Are the criteria being used to

assess sustainability changing as a result? Has the decision-making process related to sustainability changed as a result?

10. *If there were no constraints* related to integrating sustainability into the decision-making process related to sustainable commercial real estate ... what would you do? What criteria would you use for assessment?
11. What is your *vision* for sustainable real estate moving forward?
12. What information do you feel this research could provide that would most help you/the real estate industry? (and should this be in a particular format?)

While none of the comments you make will ever be specifically tied to your name, I would like to include a list of expert panel participants for my dissertation so that readers may see the caliber of industry leaders that have contributed to building the data/knowledge.

- For that purpose, would you be able to send me a resume/CV for my files ... and if you have one, a short bio?

## APPENDIX F - DELPHI METHOD: ROUND THREE E-QUESTIONNAIRE

**Sustainability in Real Estate - Delphi Panel**

**General Information**

Your responses to questions below will be used to understand your perspective for the remainder of the survey.

**\* 1. In which real estate sector(s) have you worked? (check all that apply throughout your career)**

☐ Private Real Estate Investor

☐ Public Real Estate Investor

☐ Real Estate Developer

☐ Real Estate Management

☐ Owner

☐ Corporate Tenant

☐ Non-Corporate Tenant

☐ Public Sector/Planner/Official

Other (please specify other real estate industry sectors in which you have worked):

**2. How many years have you worked in the real estate industry (in total)?**

**\* 3. Which of the following best represents the real estate industry sector in which you are currently working? (check only one)**

☐ Private Real Estate Investor

☐ Public Real Estate Investor

☐ Real Estate Developer

☐ Real Estate Management

☐ Owner

☐ Corporate Tenant

☐ Non-Corporate Tenant

☐ Public Sector/Planner/Official

Other (please specify the real estate sector in which you current work if not listed above):

**4. How many years have you worked in your current real estate industry sector?**

## Sustainability in Real Estate - Delphi Panel

**5. Is your current position an executive level position (i.e. are you part of strategic decision-making)?**

- ☐ Yes  
☐ No

What is the job title for your current position?

**6. How integrated is sustainability into the strategic decision-making process for real estate decisions at your current place of employment?**

5 - Always

4 - Frequently

3 - About Half of the  
Time

2 - Seldomly

1 - Never

Sustainability is integrated

☐☐☐☐☐

**7. Is your current position involved with sustainability-related initiatives? (check only one)**

- ☐ Yes - I am solely responsible for making decisions about implementing sustainability initiatives
- ☐ Yes - I am part of a team that oversees sustainability initiatives and their implementation
- ☐ Yes - I am part of a team that works on sustainability initiatives which makes recommendations, but am not a decision maker
- ☐ No - I have no sustainability-related responsibilities, but our firm does have some sustainability initiatives
- ☐ No - We do not currently have any sustainability-related initiatives

If yes, how long have you worked in the sustainability/sustainable real estate industry?



## Sustainability in Real Estate - Delphi Panel

### Sustainability Indicators and Drivers

If you are solely responsible for making real estate sustainability decision, are part of a team who make real estate sustainability decisions, or are part of a team who make real estate sustainability decision recommendations - please answer the following questions.

If you are not part of the real estate sustainability decision-making process, please skip to Question 7 on the next page.

Thank you.

**8. Please rate the level of importance for each of the drivers/reasons listed below for including sustainability in the strategic decision-making process for real estate-related decisions (for the real estate company/sector you currently represent)?**

|  | 5 - Very Important    | 4 - Important         | 3 - Moderately Important | 2 - Of Little Importance | 1 - Unimportant       |
|--|-----------------------|-----------------------|--------------------------|--------------------------|-----------------------|
| Risk Management  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Changing Standards for Legitimization of Firm/Business/Industry                  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Competitive Advantage in Market/Industry   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Public Pressure  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Sense of Economic Responsibility   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Self-Regulation to Avoid Further Governmental Legislation                        | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Positively Contributing to Society   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Changing Standards for Market Competitiveness                                    | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Energy Savings   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Desire to Transform Firm/Business/Industry Socially/Economically/Environmentally | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Water Reduction  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Sense of Social Responsibility   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Community Incentives   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Governmental Legislation   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Sense of Environmental Responsibility  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Consumer and/or Occupant Opinion/Pressure  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Increase Marketplace Resilience  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Legitimization in Market/Industry  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |

Other Drivers for Including Sustainability Considerations in Strategic Real Estate Decision-Making (please specify)

## Sustainability in Real Estate - Delphi Panel

**9. Please rate the level of importance for each of the indicators/measures listed below in the strategic decision-making process related to real estate/property sustainability (for the real estate company/sector you currently represent):**

|  | 5 - Very Important    | 4 - Important         | 3 - Moderately Important | 2 - Of Little Importance | 1 - Unimportant       |
|--|-----------------------|-----------------------|--------------------------|--------------------------|-----------------------|
| Recycling of Waste Products  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| While Life-cycle Value Considerations  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Environmental Management of Site   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Re-Use of Previously Developed Site  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Water Efficiency   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Indoor Thermal Comfort for Occupants   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Re-Use of Materials  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Image/Branding/PR Value  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Risk Reduction   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Indoor Air Quality   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Maintenance Considerations   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Occupant Satisfaction  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Building Adaptability  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Social Cost/Benefit Analysis   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Facility/Building/Site Management Team Expertise (to promote sustainability efforts) | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Reduction in Materials Consumption   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Economic Impact on Bottom Line   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Use of Local Materials   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Accessibility to Public Transportation   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Community Impact Consultation and Assessment   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Energy Efficiency  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Indoor Lighting/Visual Comfort for Occupants   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Reduction in Energy Usage  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |
| Alternative Transportation   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/>    | <input type="radio"/>    | <input type="radio"/> |

## Sustainability in Real Estate - Delphi Panel

### Programs

(Biking/Carpooling/Public  
Transit)

|   |                       |                       |                       |                       |                       |
|---|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Neighborhood/Community<br>Impacts                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Building User Education<br>Programs                                   | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Use (and/or Production) of<br>Alternative/Renewable<br>Primary Energy | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Monitoring of Energy Usage  | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |
| Reduction in Water<br>Consumption                                     | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> |

Other (please specify other sustainability indicators used in real estate decision-making not listed above)

**10. Please rank the following functions of sustainability indicators (relative to each other) in the strategic decision-making process for real estate-related decisions (with 1 being the most important function, and 10 being the least important function):**

|                      |   |
|----------------------|---|
| <input type="text"/> | Registration and/or Green Certification requirement fulfillment   |
| <input type="text"/> | Integrated Performance Management (considering the individual components influencing the overall building performance, as well as how those components interact together) |
| <input type="text"/> | Integrated Decision-Making (business scorecard model with and integrated environmental score used as part of decision-making process)                                     |
| <input type="text"/> | Portfolio-Level Assessment  |
| <input type="text"/> | Monitoring emissions/usage of key resources (e.g. energy, water, non-renewable materials)   |
| <input type="text"/> | Risk Management   |
| <input type="text"/> | Accountability/Reporting  |
| <input type="text"/> | Balanced Scorecard (triple bottom line) impacts   |
| <input type="text"/> | Life-Cycle Analysis   |
| <input type="text"/> | Monitoring costs  |

## Sustainability in Real Estate - Delphi Panel

### Attitude Toward Sustainability

**11. What is your perception of your current real estate sector's attitude toward sustainability? (check only one)**

- ☐ Defensive - they feel that they being judged because of the performance of others in the industry, and not their own performance
- ☐ Active - they feel a sense of responsibility to the community in which they are located
- ☐ Contributory - they feel that by being in the community, their actions have helped the community become overall more sustainable
- ☐ Holistic - they consider beyond the immediate impacts of their decisions and include life-cycle and systems-approach strategies
- ☐ Proactive - they are actively looking for ways to improve eco-efficiency and minimize their impact on the planet
- ☐ Hostile - they resent that they have to consider environmental and/or social impacts

**12. What of the following describes your perception of the current public culture/attitude with regards to how that culture/attitude is influencing the way real estate industry/companies account for their actions, policies and performance related to sustainability? (check only one)**

- ☐ Public expects us to prove that we are performing in a responsible and sustainable manner (transparency/reporting requirements).
- ☐ Public believes business/industry is acting responsibly and in good faith - no requirements on firm/business/industry.
- ☐ Public wants to be involved in the decision process.
- ☐ Public wants to be told of our actions, policies, performance.
- ☐ Public wants us to demonstrate how we are making/intend to make positive changes.

## Sustainability in Real Estate - Delphi Panel

### Thank you for your time

If you would like more information about the results from this survey, please contact:

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#### **13. If you would like a copy of the survey results, please include the following information:**

Name:

Email Address:

**14. I welcome feedback on any questions/phrasing of answer options/order of questions, etc. If you have any suggestions before I send the survey out to the members of Lambda Alpha International (LAI), Counselors of Real Estate (CRE) and Investment Property forum (IPF), please use the space below. Thanks again for your participation in the Delphi Panel!**

## APPENDIX G - DELPHI METHOD: ROUND THREE E-QUESTIONNAIRE

### RESULTS

**Exhibit G-1: Drivers For Integrating Sustainability Into Decision-Making**

| Sustainability Driver  | Mean Value            | Real Estate Investor | Real Estate Developer | Real Estate Management | Real Estate Owner   | Corporate Tenant      |
|--|-----------------------|----------------------|-----------------------|------------------------|---------------------|-----------------------|
| Competitive Advantage in Market/Industry   | 4.093 <sup>(1)</sup>  | 3.8                  | 4 <sup>(1)</sup>      | 4 <sup>(2)</sup>       | 4 <sup>(2)</sup>    | 4.667 <sup>(1)</sup>  |
| Changing Standards for Market Competitiveness                                    | 3.987 <sup>(2)</sup>  | 3.8                  | 3.8 <sup>(2)</sup>    | 3.667                  | 4 <sup>(2)</sup>    | 4.667 <sup>(1)</sup>  |
| Sense of Environmental Responsibility  | 3.873                 | 3.2                  | 4 <sup>(1)</sup>      | 4 <sup>(2)</sup>       | 3.5                 | 4.667 <sup>(1)</sup>  |
| Positively Contributing to Society   | 3.867                 | 3.2                  | 3.8 <sup>(2)</sup>    | 3.667                  | 4 <sup>(2)</sup>    | 4.667 <sup>(1)</sup>  |
| Government Legislation   | 3.86                  | 4.4 <sup>(1)</sup>   | 3.4                   | 4 <sup>(2)</sup>       | 4.5 <sup>(1)</sup>  | 3                     |
| Energy Savings   | 3.847                 | 3.6                  | 3.8 <sup>(2)</sup>    | 3.667                  | 3.5                 | 4.667 <sup>(1)</sup>  |
| Consumer and/or Occupant Opinion/Pressure  | 3.77                  | 3.6                  | 3.75                  | 4 <sup>(2)</sup>       | 4 <sup>(2)</sup>    | 3.5                   |
| Changing Standards for Legitimization of Firm/Business/Industry                  | 3.713                 | 3.2                  | 3.2                   | 3.333                  | 4.5 <sup>(1)</sup>  | 4.333 <sup>(2)</sup>  |
| Desire to Transform Firm/Business/Industry Environmentally/Socially/Economically | 3.707                 | 3.2                  | 4 <sup>(1)</sup>      | 4 <sup>(2)</sup>       | 3                   | 4.333 <sup>(2)</sup>  |
| Risk Management  | 3.673                 | 4 <sup>(2)</sup>     | 3.2                   | 4.333 <sup>(1)</sup>   | 3.5                 | 3.333                 |
| Sense of Social Responsibility   | 3.6                   | 3.2                  | 3.8 <sup>(2)</sup>    | 3.667                  | 4 <sup>(2)</sup>    | 3.333                 |
| Sense of Economic Responsibility   | 3.393                 | 3.4                  | 3.4                   | 4 <sup>(2)</sup>       | 2.5 <sup>(L2)</sup> | 3.667                 |
| Legitimization in Market/Industry  | 3.173                 | 2.6 <sup>(L2)</sup>  | 3.6                   | 3.667                  | 3                   | 3                     |
| Increase Marketplace Resilience  | 3.133                 | 3.2                  | 2.8                   | 3.333                  | 3                   | 3.333                 |
| Community Incentives   | 2.993                 | 2.4 <sup>(L1)</sup>  | 3.4                   | 3 <sup>(L2)</sup>      | 2.5 <sup>(L2)</sup> | 3.667                 |
| Water usage Reduction  | 2.553                 | 2.4 <sup>(L1)</sup>  | 2.2 <sup>(L2)</sup>   | 2.667 <sup>(L1)</sup>  | 2.5 <sup>(L2)</sup> | 3                     |
| Public Pressure  | 2.527 <sup>(L2)</sup> | 2.4 <sup>(L1)</sup>  | 2.4                   | 3 <sup>(L2)</sup>      | 2.5 <sup>(L2)</sup> | 2.333 <sup>(L2)</sup> |
| Self-regulation to Avoid Further Government Legislation                          | 2.22 <sup>(L1)</sup>  | 2.8                  | 1.8 <sup>(L1)</sup>   | 3.333                  | 1.5 <sup>(L1)</sup> | 1.667 <sup>(L1)</sup> |

**Exhibit G-2: Importance Ratings Of Sustainability Criteria used in  
Real Estate Decision-Making**

| Sustainability Criteria   | Mean Value           | Real Estate Investor | Real Estate Developer | Real Estate Management | Real Estate Owner  | Corporate Tenant       |
|---|----------------------|----------------------|-----------------------|------------------------|--------------------|------------------------|
| Occupant Satisfaction   | 4.38 <sup>(1)</sup>  | 4.2 <sup>(2)</sup>   | 4.2 <sup>(2)</sup>    | 4.333 <sup>(1)</sup>   | 4.5 <sup>(1)</sup> | 4.667 <sup>(2)</sup>   |
| Facility/Building Management Team Expertise                             | 4.327 <sup>(2)</sup> | 4.2 <sup>(2)</sup>   | 4.6 <sup>(1)</sup>    | 3.667 <sup>(3)</sup>   | 4.5 <sup>(1)</sup> | 4.667 <sup>(2)</sup>   |
| Image/Branding/PR   | 4.307 <sup>(3)</sup> | 4 <sup>(3)</sup>     | 4.2 <sup>(2)</sup>    | 4.333 <sup>(1)</sup>   | 4 <sup>(2)</sup>   | 5 <sup>(1)</sup>       |
| Reduction in Energy Usage   | 4.213                | 4.2 <sup>(2)</sup>   | 4.2 <sup>(2)</sup>    | 4.333 <sup>(1)</sup>   | 4 <sup>(2)</sup>   | 4.333 <sup>(3)</sup>   |
| Monitoring of Energy Usage  | 4.14                 | 4 <sup>(3)</sup>     | 4.2 <sup>(2)</sup>    | 4.333 <sup>(1)</sup>   | 3.5 <sup>(3)</sup> | 4.667                  |
| Indoor Lighting/Visual Comfort for Occupants                            | 4.1                  | 4 <sup>(3)</sup>     | 4 <sup>(3)</sup>      | 3                      | 4.5 <sup>(1)</sup> | 5 <sup>(1)</sup>       |
| Economic Impact (on Bottom Line)  | 4.007                | 4.4 <sup>(1)</sup>   | 3.8                   | 4.333 <sup>(1)</sup>   | 3.5 <sup>(3)</sup> | 4                      |
| Indoor Thermal Comfort for Occupants                                    | 4                    | 4 <sup>(3)</sup>     | 4 <sup>(3)</sup>      | 4 <sup>(2)</sup>       | 4 <sup>(2)</sup>   | 4                      |
| Energy Efficiency   | 3.953                | 3.8                  | 3.8                   | 4.333 <sup>(1)</sup>   | 3.5 <sup>(3)</sup> | 4.333 <sup>(3)</sup>   |
| Risk Reduction  | 3.68                 | 4.2 <sup>(2)</sup>   | 3.2                   | 4 <sup>(2)</sup>       | 4 <sup>(2)</sup>   | 3                      |
| Maintenance Considerations  | 3.633                | 3.4                  | 3.6                   | 3.667 <sup>(3)</sup>   | 3.5 <sup>(3)</sup> | 4                      |
| Indoor Air Quality  | 3.56                 | 3.4                  | 3.4                   | 3.667 <sup>(3)</sup>   | 3                  | 4.333 <sup>(3)</sup>   |
| Accessibility to Public Transportation                                  | 3.407                | 3.6                  | 3.6                   | 3.667 <sup>(3)</sup>   | 3.5 <sup>(3)</sup> | 2.667 <sup>(1,2)</sup> |
| Recycling of Waste Production   | 3.22                 | 3.2                  | 3.4                   | 3.333                  | 2.5                | 3.667                  |
| Community Impact Consultation and Assessment                            | 3.206                | 3.2                  | 3                     | 3.333                  | 3.5 <sup>(3)</sup> | 3                      |
| Environmental Management of Site  | 3.18                 | 3.6                  | 2.8                   | 3.333                  | 3.5 <sup>(3)</sup> | 2.667 <sup>(1,2)</sup> |
| Alternative Transportation Programs (Biking/ Carpooling/Public Transit) | 3.147                | 3.4                  | 3                     | 3                      | 3                  | 3.333                  |
| Whole Life-Cycle Value of Property                                      | 2.933                | 2.6                  | 2.4 <sup>(1,2)</sup>  | 3                      | 3                  | 3.667                  |
| Building Adaptability   | 2.88                 | 3                    | 2.4 <sup>(1,2)</sup>  | 3                      | 3                  | 3                      |
| Use (and/or Production) of Alternative/Renewable Primary Energy         | 2.88                 | 2.4                  | 3                     | 3.333                  | 2 <sup>(1,2)</sup> | 3.667                  |
| Water Efficiency  | 2.873                | 2.6                  | 2.6                   | 3                      | 2.5                | 3.667                  |

**Exhibit G-2: Importance Ratings Of Sustainability Criteria used in  
Real Estate Decision-Making - continued**

| <b>Sustainability<br/>Criteria (con't)</b> | <b>Mean<br/>Value</b> | <b>Real<br/>Estate<br/>Investor</b> | <b>Real<br/>Estate<br/>Developer</b> | <b>Real<br/>Estate<br/>Manage-<br/>ment</b> | <b>Real Estate<br/>Owner</b> | <b>Corporate<br/>Tenant</b> |
|--|-----------------------|-------------------------------------|--------------------------------------|---|------------------------------|-----------------------------|
| Neighborhood/Community Impacts             | 2.86                  | 2.8                                 | 3                                    | 3.333                                       | 2.5                          | 2.667 <sup>(L2)</sup>       |
| Reuse of Previously Developed Site         | 2.86                  | 3                                   | 2.8                                  | 2 <sup>(L1)</sup>                           | 3.5 <sup>(3)</sup>           | 3                           |
| Reduction in Water Consumption             | 2.833                 | 3                                   | 2.5                                  | 3   | 2 <sup>(L2)</sup>            | 2.667 <sup>(L2)</sup>       |
| Reduction in Materials Consumption         | 2.773                 | 2.8                                 | 2.4 <sup>(L2)</sup>                  | 3   | 3                            | 2.667 <sup>(L2)</sup>       |
| Building User Education Programs           | 2.7                   | 2.2 <sup>(L2)</sup>                 | 2.8                                  | 2.333 <sup>(L2)</sup>                       | 2.5                          | 3.667                       |
| Use of Local Materials                     | 2.7                   | 2.4                                 | 2.6                                  | 2.333 <sup>(L2)</sup>                       | 2.5                          | 3.667                       |
| Social Cost/Benefit Analysis               | 2.42 <sup>(L2)</sup>  | 2 <sup>(L2)</sup>                   | 2.6                                  | 3.667 <sup>(3)</sup>                        | 1.5 <sup>(L1)</sup>          | 2.333 <sup>(L1)</sup>       |
| Reuse of Materials                         | 2.327 <sup>(L1)</sup> | 2.5                                 | 1.8 <sup>(L1)</sup>                  | 2.5   | 2.5                          | 2.333 <sup>(L1)</sup>       |

Exhibits G-1 and G-2: The three most important <sup>(1, 2, 3)</sup> and two least important <sup>(L1,L2)</sup> functions of sustainability criteria and indicators in the strategic decision-making and planning process are identified by stakeholder. Nine panelists answered this question.



## APPENDIX H - WORD FREQUENCY ANALYSIS RESULTS

**Exhibit H-1: Word Frequency Analysis:  
Themes and Frequency of Delphi Interview Words**

| <b>Categories of Description ('Themes')</b>    | <b>Word Frequency</b> | <b>% of Reduced List (17,233)</b> |
|--|-----------------------|-----------------------------------|
| Economic: market, costs and performance        | 2,970                 | 20.55%                            |
| Decision-making strategies and drivers         | 2,812                 | 19.45%                            |
| Environment & energy                           | 1,723                 | 11.92%                            |
| Physical and locational attributes of property | 1,752                 | 12.12%                            |
| Performance reporting and measurement          | 1,715                 | 11.86%                            |
| Sustainability (the word and or 'green')       | 866                   | 5.99%                             |
| Legal and regulatory                           | 844                   | 5.84%                             |
| Social responsibility                          | 713                   | 4.93%                             |
| Behavioral                                     | 491                   | 3.40%                             |
| Global warming, climate change, emissions      | 217                   | 1.50%                             |
| Risk management                                | 141                   | 0.98%                             |
| Barriers and trends                            | 110                   | 0.76%                             |
| Technology and innovation                      | 102                   | 0.71%                             |
| <b>Total words categorized into themes</b>     | <b>14,456</b>         | <b>100.00%</b>                    |

Exhibits H-1: Word Frequency Analysis: Themes and Frequency of Delphi Interview Words. The table lists the thirteen themes as well as the total number of words used during the Delphi interviews that comprise the theme and the frequency as a percentage of the total word count on the reduced list.

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